Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:04

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	92 m^2
Site Reference	A01	Plot Reference	A01
Address	A01, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*12.88 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.07 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*68.75 kWh_{PE}/m^2*	
Dwelling primary energy	15.2 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*36.5 kWh/m^2*	
Dwelling fabric energy efficiency	34.6 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	0.1	Ground floor (0.1)	OK
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	84.9	0.15
Ground floor: Ground floor	92.2	0.1 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	West	N/A	1 **(!)**
2, Windows (1)	2.34	North East	0.7	1.2
3, Windows (1)	2.34	North East	0.7	1.2
4, Windows (1)	3.12	North East	0.7	1.2
5, Windows (1)	3.12	South	0.7	1.2
6, Windows (1)	3.12	South	0.7	1.2
7, Windows (1)	3.12	South	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.55 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	1.14 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A01
Dwelling Type: New Dwelling Design Stage

A01
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	92.2	(1a) x	2.6	(2a) =	239.72	(3a)
Total floor area TFA					92.2	(4)
Dwelling volume					239.72	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	3	3	(19)
Shelter factor		0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	19.65		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	9.22	10142	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	12.74	1188.6	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		196.42	(31)
Party Wall	0	0	(32)
Party floor		0	(32a)
Party ceiling		2766	(32b)
Internal wall **		1506.6	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		43.76	(33)
Heat capacity Cm = ∑(A x k)		15603.2	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		169.23	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		9.8	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		9.8	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		53.56	(37)

Ventilation heat loss calculated monthly

19.24	19.01	18.78	17.63	17.4	16.25	16.25	16.02	16.71	17.4	17.86	18.32	(38)

Heat transfer coefficient, W/K

72.8	72.57	72.34	71.19	70.97	69.82	69.82	69.59	70.28	70.97	71.42	71.88	(39)

Heat loss parameter (HLP), W/m²K

0.79	0.79	0.78	0.77	0.77	0.76	0.76	0.75	0.76	0.77	0.77	0.78	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N		2.65	(42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

68.73	67.7	66.19	63.31	61.19	58.82	57.47	58.96	60.6	63.15	66.09	68.47	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

29.68	29.24	28.62	27.47	26.62	25.67	25.15	25.77	26.44	27.46	28.63	29.58	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

41.82	40.3	38.78	37.25	35.73	34.21	34.21	35.73	37.25	38.78	40.3	41.82	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J)	129.08	(43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

140.22	137.23	133.58	128.04	123.54	118.7	116.84	120.47	124.3	129.38	135.01	139.86	1547.16	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

222.08	195.41	205.31	175.28	166.3	145.95	141.3	149.16	153.27	175.56	192.34	218.99	2140.98	(45)

Distribution loss (46) = 0.15 x (45)

33.31	29.31	30.8	26.29	24.95	21.89	21.2	22.37	22.99	26.33	28.85	32.85	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel	0	(47)
Water storage loss (or HIU loss)		
a) If manufacturer's declared loss factor is known (kWh/day):	1.4	(48)

Temperature factor from Table 2b	0.6	(49)
Energy lost from water storage, kWh/day (48) x (49) =	0.84	(50)
b) If manufacturer's declared loss factor is not known :		
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/day	0	(54)
Enter (50) or (54) in (55)	0.84	(55)

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

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,
(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m
where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(57)

Primary circuit loss for each month from Table 3
modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26	(59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0	0	0	0	0	0	0	0	0	0	0	0	(61)

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

271.38	239.95	254.62	222.99	215.61	193.66	190.61	198.46	200.98	224.87	240.06	268.29	2721.47	(62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0	0	0	0	0	0	0	0	0	0	0	0	(63b)

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

0	0	0	0	0	0	0	0	0	0	0	0	(63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

271.38	239.95	254.62	222.99	215.61	193.66	190.61	198.46	200.98	224.87	240.06	268.29	2721.47	(64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0	0	0	0	0	0	0	0	0	0	0	0	(64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

113.28	100.6	107.71	96.45	94.74	86.7	86.43	89.04	89.13	97.82	102.12	112.26	(65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

132.73	132.73	132.73	132.73	132.73	132.73	132.73	132.73	132.73	132.73	132.73	132.73	(66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

124.58	137.93	124.58	128.73	124.58	128.73	124.58	124.58	128.73	124.58	128.73	124.58	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

243.07	245.59	239.23	225.7	208.62	192.57	181.84	179.32	185.68	199.21	216.29	232.34	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-106.19	-106.19	-106.19	-106.19	-106.19	-106.19	-106.19	-106.19	-106.19	-106.19	-106.19	-106.19	(71)

Water heating gains (Table 5)

152.26	149.7	144.77	133.96	127.34	120.41	116.16	119.68	123.79	131.47	141.84	150.88	(72)

Total internal gains

582.73	596.04	571.41	551.22	523.36	504.54	485.41	486.4	501.03	518.08	549.68	570.63	(73)

6. Solar gains

Solar gains in watts, calculated for each month

114.74	195.55	269.74	340.94	390.24	391.69	375.81	337.99	294.03	216.53	137.4	98.23	(83)

Total gains – internal and solar (watts)

697.47	791.59	841.15	892.16	913.6	896.23	861.22	824.38	795.05	734.62	687.09	668.86	(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, ⍰1,m (see Table 9a)

0.97	0.95	0.91	0.82	0.68	0.49	0.36	0.39	0.59	0.84	0.95	0.98	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

20.08	20.28	20.51	20.78	20.93	20.99	21	21	20.97	20.79	20.41	20.05	(87)

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

20.26	20.26	20.27	20.28	20.28	20.29	20.29	20.29	20.29	20.28	20.28	20.27	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.97	0.94	0.89	0.79	0.64	0.44	0.3	0.33	0.54	0.81	0.94	0.97	(89)

Roof

Mean internal temperature in the rest of dwelling T2

19.43	19.63	19.85	20.1	20.23	20.28	20.29	20.29	20.27	20.12	19.76	19.4	(90)

Living area fraction 0.34 (91)

Mean internal temperature (for the whole dwelling)

19.65	19.85	20.07	20.33	20.47	20.52	20.53	20.53	20.51	20.34	19.98	19.62	(92)

Adjusted mean internal temperature:

19.65	19.85	20.07	20.33	20.47	20.52	20.53	20.53	20.51	20.34	19.98	19.62	(93)

8. Space heating requirement

Utilisation factor for gains,

0.96	0.93	0.89	0.79	0.65	0.46	0.32	0.35	0.55	0.81	0.93	0.97	(94)

Useful gains, mGm , W

670.66	739.13	749.07	708.61	590.85	409.3	273.83	286.6	439.3	594.32	638.98	646.8	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

1117.37	1085.01	982.05	813.67	622.17	413.52	274.35	287.43	450.32	691.47	920.06	1108.57	(97)

Space heating requirement for each month

332.36	232.43	173.34	75.65	23.3	0	0	0	0	72.28	202.38	343.56	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

332.36	232.43	173.34	75.65	23.3	0	0	0	0	72.28	202.38	343.56	(98c)

Space heating requirement in kWh/m²/year 15.78 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1528.06	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2721.47	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	42.5	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												201.07	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												201.07	(331)
Electricity for lighting (calculated in Appendix L)												208.91	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	14.02	23.71	41.29	54.53	64.81	62.66	61.47	54.58	43.25	29.89	16.5	11.56	478.28 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	3.62	9.39	23.84	43.97	65.46	68.66	66.77	51.94	32.27	14.89	5.17	2.69	388.69 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													4659.51

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		67.85	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		120.83	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	33.16	(349)
Electricity for lighting	0	34.45	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-100.6	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	247.69	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.65	(357)
SAP rating	89.46	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			6.23	(372)
Total CO2 associated with heat networks			150.72	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			150.72	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			27.89	(378)
Electricity for lighting			30.15	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			98.74	(383)
Total CO2, kg/year			1.07	(384)
EI rating (section 14)			99.04	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			65.55	(472)
Total CO2 associated with heat networks			1660.19	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1660.19	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			304.17	(478)
Electricity for lighting			320.44	(479)
energy saved or generated				
energy saved or generated	0		-883.54	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1401.26	(383)
Dwelling CO2 Emission Rate			15.2	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:05

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	73 m^2
Site Reference	A02	Plot Reference	A02
Address	A02, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*14.48 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.4 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*77.54 kWh_{PE}/m^2*	
Dwelling primary energy	18.66 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*39 kWh/m^2*	
Dwelling fabric energy efficiency	36.2 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	0.1	Ground floor (0.1)	OK
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.17	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	52.98	0.15
Exposed wall: Stair	23.22	0.15
Ground floor: Ground floor	73.4	0.1 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	South East	N/A	1 **(!)**
2, Windows (1)	2.34	South West	0.7	1.2
3, Windows (1)	3.12	South West	0.7	1.2
4, Windows (1)	5.4	West	0.7	1.2
5, Windows (1)	3.12	West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.9 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A02
Dwelling Type: New Dwelling Design Stage

A02
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	73.4	(1a) x	2.6	(2a) =	190.84	(3a)
Total floor area TFA					73.4	(4)
Dwelling volume					190.84	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	2	2	(19)
Shelter factor		0.85	(20)

Infiltration rate incorporating shelter factor 0.13 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)	0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15	1.67	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

Effective air change rate from PCDB:

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	16.01		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	7.34	1468	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	11.43	1066.8	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		165.74	(31)
Party Wall	0	0	(32)
Party floor		0	(32a)
Party ceiling		2202	(32b)
Internal wall **		1117.8	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		36.94	(33)
Heat capacity Cm = ∑(A x k)		5854.6	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		79.76	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		8.3	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		8.3	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		45.24	(37)

Ventilation heat loss calculated monthly

16.22	16.02	15.82	14.82	14.61	13.61	13.61	13.41	14.01	14.61	15.02	15.42	(38)

Heat transfer coefficient, W/K

61.46	61.26	61.06	60.05	59.85	58.85	58.85	58.65	59.25	59.85	60.25	60.66	(39)

Heat loss parameter (HLP), W/m²K

0.84	0.83	0.83	0.82	0.82	0.8	0.8	0.8	0.81	0.82	0.82	0.83	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N	2.33	(42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

63.22	62.27	60.88	58.23	56.28	54.1	52.86	54.23	55.74	58.08	60.78	62.97	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

27.31	26.9	26.33	25.28	24.49	23.62	23.14	23.71	24.33	25.26	26.34	27.22	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

38.45	37.05	35.65	34.25	32.86	31.46	31.46	32.86	34.25	35.65	37.05	38.45	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J)	118.72	(43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

128.97	126.22	122.86	117.76	113.62	109.17	107.46	110.8	114.32	118.99	124.17	128.64	1422.99 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

204.26	179.73	188.84	161.21	152.96	134.24	129.96	137.19	140.97	161.47	176.91	201.41	1969.15 (45)

Distribution loss (46) = 0.15 x (45)

30.64	26.96	28.33	24.18	22.94	20.14	19.49	20.58	21.15	24.22	26.54	30.21	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel	0	(47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day):	1.4	(48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

253.56 224.26 238.14 208.92 202.26 181.95 179.26 186.49 188.68 210.78 224.62 250.72 2549.65 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

253.56 224.26 238.14 208.92 202.26 181.95 179.26 186.49 188.68 210.78 224.62 250.72 2549.65 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

107.36 95.39 102.23 91.77 90.3 82.8 82.65 85.06 85.04 93.13 96.99 106.41 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

104.79	116.01	104.79	108.28	104.79	108.28	104.79	104.79	108.28	104.79	108.28	104.79	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

205.1	207.23	201.86	190.45	176.03	162.49	153.44	151.31	156.67	168.09	182.5	196.05	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	(71)

Water heating gains (Table 5)

144.3	141.94	137.41	127.46	121.37	115.01	111.09	114.33	118.11	125.18	134.71	143.03	(72)

Total internal gains

512.07	523.07	501.94	484.07	460.08	443.66	427.2	428.31	440.95	455.94	483.38	501.75	(73)

6. Solar gains

Solar gains in watts, calculated for each month

80.38	146.16	219.89	298.27	352.19	356.14	340.76	300.51	247.54	167.35	98.07	67.57	(83)

Total gains – internal and solar (watts)

592.45	669.23	721.83	782.34	812.26	799.8	767.96	728.81	688.49	623.29	581.45	569.32	(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, ⍰1,m (see Table 9a)

0.89	0.86	0.81	0.71	0.59	0.44	0.33	0.36	0.53	0.74	0.85	0.9	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.21	19.51	19.9	20.38	20.71	20.91	20.97	20.96	20.84	20.41	19.76	19.17	(87)

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

20.22	20.22	20.23	20.24	20.24	20.25	20.25	20.25	20.25	20.24	20.24	20.23	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.88	0.84	0.79	0.68	0.55	0.4	0.27	0.3	0.48	0.71	0.84	0.89	(89)

Roof

Mean internal temperature in the rest of dwelling T2

18.58	18.87	19.25	19.71	20.01	20.19	20.24	20.23	20.13	19.75	19.13	18.55	(90)

Living area fraction 0.37 (91)

Mean internal temperature (for the whole dwelling)

18.81	19.11	19.49	19.95	20.27	20.46	20.51	20.5	20.39	19.99	19.36	18.78	(92)

Adjusted mean internal temperature:

18.81	19.11	19.49	19.95	20.27	20.46	20.51	20.5	20.39	19.99	19.36	18.78	(93)

8. Space heating requirement

Utilisation factor for gains,

0.86	0.82	0.77	0.67	0.55	0.41	0.29	0.32	0.49	0.7	0.82	0.87	(94)

Useful gains, mGm , W

510.71	550.42	554.9	527.36	450.17	325.97	224.68	233.66	339.59	435.29	475.44	496.05	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

891.86	870.33	793.12	663.83	512.99	344.62	229.96	240.61	372.93	562.02	738.81	884.13	(97)

Space heating requirement for each month

283.57	214.98	177.24	98.26	46.74	0	0	0	0	94.29	189.63	288.73	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

283.57	214.98	177.24	98.26	46.74	0	0	0	0	94.29	189.63	288.73	(98c)

Space heating requirement in kWh/m²/year 18.98 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1463.1	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2549.65	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	40.13	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												157.16	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												157.16	(331)
Electricity for lighting (calculated in Appendix L)												175.72	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	11.16	18.93	33.13	43.95	52.45	50.79	49.82	44.13	34.83	23.94	13.15	9.19	385.47 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.77	7.19	18.3	33.81	50.4	52.89	51.42	39.97	24.79	11.42	3.96	2.06	298.97 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													4345.61

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		64.96	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		113.2	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	25.92	(349)
Electricity for lighting	0	28.98	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-80.28	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	244.78	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.74	(357)
SAP rating	87.94	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			5.87	(372)
Total CO2 associated with heat networks			142.3	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			142.3	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			21.8	(378)
Electricity for lighting			25.36	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			102.56	(383)
Total CO2, kg/year			1.4	(384)
EI rating (section 14)			98.84	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			61.83	(472)
Total CO2 associated with heat networks			1567.61	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1567.61	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			237.75	(478)
Electricity for lighting			269.52	(479)
energy saved or generated				
energy saved or generated	0		-705.59	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1369.29	(383)
Dwelling CO2 Emission Rate			18.66	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:06

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	59 m^2
Site Reference	A03	Plot Reference	A03
Address	A03, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*16.77 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.83 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*90.08 kWh_{PE}/m^2*	
Dwelling primary energy	23.35 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*43.9 kWh/m^2*	
Dwelling fabric energy efficiency	42.8 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	0.1	Ground floor (0.1)	OK
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	39.99	0.15
Exposed wall: Stair	18.09	0.15
Exposed wall: Lift	8.64	0.15
Ground floor: Ground floor	58.8	0.1 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	East	N/A	1 **(!)**
2, Windows (1)	3.12	North	0.7	1.2
3, Windows (1)	3.12	North	0.7	1.2
4, Windows (1)	2.34	North	0.7	1.2
5, Windows (1)	5.52	North West	0.7	1.2
6, Windows (1)	2.34	North West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.72 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A03
Dwelling Type: New Dwelling Design Stage

A03
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	58.8	(1a) x	2.6	(2a) =	152.88	(3a)
Total floor area TFA					58.8	(4)
Dwelling volume					152.88	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	2	2	(19)
Shelter factor		0.85	(20)

Infiltration rate incorporating shelter factor 0.13 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)	0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15	1.67	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

Effective air change rate from PCDB:

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	18.82		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	5.88	1176	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	10.01	934.08	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		144.12	(31)
Party Wall	0	0	(32)
Party floor		0	(32a)
Party ceiling		1764	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		36.87	(33)
Heat capacity Cm = ∑(A x k)		4603.08	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		78.28	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		7.2	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		7.2	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		44.07	(37)

Ventilation heat loss calculated monthly

12.99	12.83	12.67	11.87	11.71	10.9	10.9	10.74	11.23	11.71	12.03	12.35	(38)

Heat transfer coefficient, W/K

57.07	56.91	56.74	55.94	55.78	54.98	54.98	54.82	55.3	55.78	56.1	56.42	(39)

Heat loss parameter (HLP), W/m²K

0.97	0.97	0.97	0.95	0.95	0.93	0.93	0.93	0.94	0.95	0.95	0.96	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 1.95 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

56.87	56.02	54.77	52.39	50.63	48.67	47.56	48.79	50.15	52.25	54.69	56.65	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

24.58	24.22	23.7	22.75	22.04	21.26	20.83	21.34	21.9	22.74	23.71	24.5	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

34.57	33.32	32.06	30.8	29.55	28.29	28.29	29.55	30.8	32.06	33.32	34.57	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 106.81 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

116.03	113.55	110.53	105.95	102.22	98.22	96.68	99.68	102.85	107.05	111.71	115.73	1280.18 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

183.76	161.69	169.89	145.03	137.61	120.77	116.92	123.42	126.82	145.27	159.15	181.2	1771.54 (45)

Distribution loss (46) = 0.15 x (45)

27.56	24.25	25.48	21.76	20.64	18.12	17.54	18.51	19.02	21.79	23.87	27.18	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

233.06 206.23 219.19 192.75 186.91 168.48 166.22 172.73 174.53 194.57 206.86 230.5 2352.03 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

233.06 206.23 219.19 192.75 186.91 168.48 166.22 172.73 174.53 194.57 206.86 230.5 2352.03 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

100.54 89.39 95.93 86.39 85.2 78.32 78.32 80.48 80.34 87.74 91.09 99.69 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

85.7	94.88	85.7	88.56	85.7	88.56	85.7	85.7	88.56	85.7	88.56	85.7	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

169.91	171.67	167.23	157.77	145.83	134.61	127.11	125.35	129.79	139.25	151.19	162.41	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	(71)

Water heating gains (Table 5)

135.14	133.02	128.94	119.99	114.51	108.78	105.27	108.17	111.58	117.94	126.51	133.99	(72)

Total internal gains

442.96	451.79	434.08	418.53	398.26	384.16	370.29	371.44	382.14	395.1	418.47	434.32	(73)

6. Solar gains

Solar gains in watts, calculated for each month

39.28	77.47	135.67	220.48	296.67	316.9	296.18	235.58	164.27	93.46	48.93	32.41	(83)

Total gains – internal and solar (watts)

482.24	529.25	569.75	639.01	694.93	701.07	666.47	607.02	546.41	488.56	467.4	466.73	(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, ⍰1,m (see Table 9a)

0.9	0.87	0.83	0.74	0.61	0.45	0.35	0.39	0.58	0.78	0.87	0.91	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

18.77	19.05	19.49	20.11	20.58	20.86	20.95	20.93	20.72	20.13	19.38	18.73	(87)

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

20.11	20.11	20.11	20.12	20.13	20.14	20.14	20.14	20.13	20.13	20.12	20.12	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.89	0.86	0.81	0.71	0.57	0.4	0.28	0.32	0.53	0.75	0.85	0.9	(89)

Roof

Mean internal temperature in the rest of dwelling T2

18.08	18.35	18.78	19.37	19.8	20.04	20.11	20.1	19.94	19.4	18.68	18.05	(90)

Living area fraction 0.45 (91)

Mean internal temperature (for the whole dwelling)

18.39	18.67	19.1	19.7	20.15	20.41	20.49	20.48	20.29	19.73	19	18.36	(92)

Adjusted mean internal temperature:

18.39	18.67	19.1	19.7	20.15	20.41	20.49	20.48	20.29	19.73	19	18.36	(93)

8. Space heating requirement

Utilisation factor for gains,

0.87	0.84	0.79	0.7	0.57	0.42	0.31	0.35	0.54	0.73	0.83	0.87	(94)

Useful gains, mGm , W

417.44	442.87	450.26	444.72	395.16	294.5	205.71	212.13	294.22	357.27	387.53	407.4	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

804.1	783.34	715.21	604.32	471.37	319.46	213.85	223.43	342.4	509.26	667.59	798.84	(97)

Space heating requirement for each month

287.67	228.79	197.12	114.91	56.7	0	0	0	0	113.08	201.64	291.23	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

287.67	228.79	197.12	114.91	56.7	0	0	0	0	113.08	201.64	291.23	(98c)

Space heating requirement in kWh/m²/year 25.36 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1565.7	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2352.03	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	39.18	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside													125.9	(330a)
warm air heating system fans													0	(330b)
pump for solar water heating													0	(330g)
pump for storage WWHRS (see section G3.3)													0	(330h)
electricity use by heat interface unit													0	(330i)
Total electricity for pumps and fans													125.9	(331)
Electricity for lighting (calculated in Appendix L)													143.71	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling														
PV	8.97	15.25	26.75	35.6	42.58	41.28	40.49	35.82	28.19	19.31	10.58	7.38	312.2	(333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0	(334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0	(335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported														
PV	2.17	5.65	14.39	26.61	39.7	41.66	40.5	31.47	19.5	8.97	3.11	1.62	235.36	(333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0	(334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0	(335b)
Appendix Q items: annual energy													0	
energy saved													0	(336b)
energy used													0	(337b)
Total delivered energy for all uses													4187.34	

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		69.52	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		104.43	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	20.76	(349)
Electricity for lighting	0	23.7	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-64.64	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	245.77	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.85	(357)
SAP rating	86.18	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)	0	(361)
Heat efficiency of CHP unit (e.g. 50%)	0	(362)

	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			5.74	(372)
Total CO2 associated with heat networks			138.94	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			138.94	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			17.46	(378)
Electricity for lighting			20.74	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			107.61	(383)
Total CO2, kg/year			1.83	(384)
EI rating (section 14)			98.61	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			60.4	(472)
Total CO2 associated with heat networks			1530.53	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1530.53	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			190.46	(478)
Electricity for lighting			220.43	(479)
energy saved or generated				
energy saved or generated	0		-568.37	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1373.05	(383)
Dwelling CO2 Emission Rate			23.35	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:07

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	51 m^2
Site Reference	A14	Plot Reference	A14
Address	A14, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*14.35 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.31 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*77.33 kWh_{PE}/m^2*	
Dwelling primary energy	17.66 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*28.2 kWh/m^2*	
Dwelling fabric energy efficiency	26 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	0	PW (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.15	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	31.765	0.15
Exposed wall: Corridor	11.61	0.15
Party wall: PW	27.81	0 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North East	N/A	1 **(!)**
2, Windows (1)	0.845	North East	0.7	1.2
3, Windows (1)	3.12	North East	0.7	1.2
4, Windows (1)	2.34	North East	0.7	1.2
5, Windows (1)	1.08	South East	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.63 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A14
Dwelling Type: New Dwelling Design Stage

A14
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	50.9	(1a) x	2.6	(2a) =	132.34	(3a)
Total floor area TFA					50.9	(4)
Dwelling volume					132.34	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	2	2	(19)
Shelter factor		0.85	(20)

Infiltration rate incorporating shelter factor 0.13 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15	1.67	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

Effective air change rate from PCDB:

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	8.46		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	6.51	607.18	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		52.92	(31)
Party Wall	0	556.2	(32)
Party floor		2036	(32a)
Party ceiling		1527	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		17.13	(33)
Heat capacity Cm = ∑(A x k)		5455.38	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		107.18	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		2.65	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		2.65	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		19.78	(37)

Ventilation heat loss calculated monthly

	11.25	11.11	10.97	10.27	10.13	9.44	9.44	9.3	9.72	10.13	10.41	10.69	(38)

Heat transfer coefficient, W/K

	31.03	30.89	30.75	30.05	29.91	29.22	29.22	29.08	29.49	29.91	30.19	30.47	(39)

Heat loss parameter (HLP), W/m²K

	0.61	0.61	0.6	0.59	0.59	0.57	0.57	0.57	0.58	0.59	0.59	0.6	(40)

Number of days in month (Table 1a)

	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 1.72 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

	53	52.21	51.04	48.82	47.18	45.36	44.32	45.47	46.73	48.7	50.96	52.8	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

	22.92	22.58	22.1	21.21	20.55	19.82	19.42	19.9	20.41	21.2	22.1	22.84	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

	32.21	31.04	29.87	28.7	27.52	26.35	26.35	27.52	28.7	29.87	31.04	32.21	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 99.53 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

	108.13	105.82	103.01	98.73	95.26	91.53	90.09	92.89	95.84	99.76	104.1	107.85	1193.02 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

	171.25	150.68	158.32	135.16	128.24	112.54	108.96	115.02	118.19	135.38	148.32	168.86	1650.91 (45)

Distribution loss (46) = 0.15 x (45)

	25.69	22.6	23.75	20.27	19.24	16.88	16.34	17.25	17.73	20.31	22.25	25.33	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

220.55 195.22 207.62 182.87 177.54 160.26 158.26 164.32 165.9 184.68 196.03 218.16 2231.41 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

220.55 195.22 207.62 182.87 177.54 160.26 158.26 164.32 165.9 184.68 196.03 218.16 2231.41 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

96.38 85.73 92.08 83.11 82.08 75.59 75.67 77.69 77.47 84.45 87.48 95.59 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

80.3	88.91	80.3	82.98	80.3	82.98	80.3	80.3	82.98	80.3	82.98	80.3	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

149.57	151.12	147.21	138.89	128.37	118.5	111.9	110.34	114.26	122.58	133.09	142.97	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	(71)

Water heating gains (Table 5)

129.55	127.57	123.77	115.43	110.32	104.99	101.71	104.42	107.59	113.51	121.51	128.48	(72)

Total internal gains

408.17	416.35	400.03	386.04	367.75	355.21	342.66	343.81	353.58	365.15	386.33	400.5	(73)

6. Solar gains

Solar gains in watts, calculated for each month

24.22	46.41	77.21	118.65	153.88	162	152.34	124.65	91.34	54.99	29.95	20.12	(83)

Total gains – internal and solar (watts)

432.38	462.76	477.24	504.7	521.63	517.21	495	468.46	444.92	420.14	416.27	420.62	(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, ⍰1,m (see Table 9a)

0.88	0.84	0.78	0.66	0.52	0.36	0.26	0.28	0.45	0.68	0.82	0.88	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

20.35	20.49	20.66	20.86	20.96	20.99	21	21	20.98	20.87	20.62	20.34	(87)

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

20.42	20.42	20.43	20.44	20.44	20.45	20.45	20.46	20.45	20.44	20.44	20.43	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.86	0.82	0.76	0.64	0.49	0.33	0.23	0.25	0.42	0.65	0.8	0.87	(89)

Roof

Mean internal temperature in the rest of dwelling T2

19.83	19.96	20.13	20.32	20.41	20.45	20.45	20.46	20.44	20.34	20.11	19.83	(90)

Living area fraction 0.46 (91)

Mean internal temperature (for the whole dwelling)

20.06	20.2	20.37	20.57	20.66	20.7	20.7	20.7	20.69	20.58	20.34	20.06	(92)

Adjusted mean internal temperature:

20.06	20.2	20.37	20.57	20.66	20.7	20.7	20.7	20.69	20.58	20.34	20.06	(93)

8. Space heating requirement

Utilisation factor for gains,

0.86	0.82	0.76	0.64	0.5	0.34	0.24	0.27	0.43	0.66	0.8	0.86	(94)

Useful gains, mGm , W

370.15	378.88	363.97	325.18	260.76	177.14	119.67	124.86	191.43	275.53	331.42	363.24	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

489.09	472.65	426.49	350.66	268.03	178.15	119.84	125.11	194.25	298.57	399.79	483.26	(97)

Space heating requirement for each month

88.49	63.01	46.52	18.34	5.41	0	0	0	0	17.14	49.22	89.3	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

88.49	63.01	46.52	18.34	5.41	0	0	0	0	17.14	49.22	89.3	(98c)

Space heating requirement in kWh/m²/year 7.42 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	396.31	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2231.41	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	26.28	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												108.98	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												108.98	(331)
Electricity for lighting (calculated in Appendix L)												134.66	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	7.86	13.38	23.49	31.28	37.45	36.33	35.64	31.51	24.79	16.96	9.28	6.47	274.44 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	1.89	4.91	12.51	23.15	34.54	36.25	35.23	27.36	16.95	7.79	2.7	1.4	204.67 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													2871.36

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		17.6	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		99.07	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	17.97	(349)
Electricity for lighting	0	22.21	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-56.7	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	192.15	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.72	(357)
SAP rating	88.31	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)	0	(361)
Heat efficiency of CHP unit (e.g. 50%)	0	(362)

	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			3.76	(372)
Total CO2 associated with heat networks			93.11	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			93.11	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			15.12	(378)
Electricity for lighting			19.44	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			66.81	(383)
Total CO2, kg/year			1.31	(384)
EI rating (section 14)			99.07	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			40.2	(472)
Total CO2 associated with heat networks			1026.25	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1026.25	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			164.87	(478)
Electricity for lighting			206.54	(479)
energy saved or generated				
energy saved or generated	0		-498.62	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			899.05	(383)
Dwelling CO2 Emission Rate			17.66	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:09

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	42 m^2
Site Reference	A15	Plot Reference	A15
Address	A15, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*16.29 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.74 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*87.94 kWh_{PE}/m^2*	
Dwelling primary energy	22.28 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*30.9 kWh/m^2*	
Dwelling fabric energy efficiency	33.4 kWh/m^2	FAIL

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	0	PW (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.17	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	34.44	0.15
Exposed wall: Corridor	5.67	0.15
Party wall: PW	27.81	0 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North East	N/A	1 **(!)**
2, Windows (1)	1.08	South East	0.7	1.2
3, Windows (1)	2.34	South West	0.7	1.2
4, Windows (1)	2.34	South West	0.7	1.2
5, Windows (1)	2.34	North East	0.7	1.2
6, Windows (1)	5.52	South West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.51 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A15
Dwelling Type: New Dwelling Design Stage

A15
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	41.6	(1a) x	2.6	(2a) =	108.16	(3a)
Total floor area TFA					41.6	(4)
Dwelling volume					108.16	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)
			Air changes per hour		
Number of storeys in the dwelling (ns)			0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc			0	0	(9)
Additional infiltration			0	0	(10)
Structural infiltration			0	0	(11)
Suspended wooden ground floor			0	0	(12)
No draught lobby			0	0	(13)
Percentage of windows and doors draught proofed			0	0	(14)
Window infiltration			0	0	(15)
Infiltration rate			0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)			3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)			0	0	(17a)
Air permeability value)			0.15	0.15	(18)
Number of sides on which dwelling is sheltered			3	3	(19)
Shelter factor				0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	15.6		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	6.02	561.54	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		55.89	(31)
Party Wall	0	556.2	(32)
Party floor		1664	(32a)
Party ceiling		1248	(32b)
Internal wall **		340.2	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		23.77	(33)
Heat capacity Cm = ∑(A x k)		4369.94	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		105.05	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		2.8	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		2.8	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		26.57	(37)

Ventilation heat loss calculated monthly

8.68	8.58	8.47	7.96	7.85	7.33	7.33	7.23	7.54	7.85	8.06	8.27	(38)

Heat transfer coefficient, W/K

35.25	35.15	35.05	34.53	34.42	33.9	33.9	33.8	34.11	34.42	34.63	34.84	(39)

Heat loss parameter (HLP), W/m²K

0.85	0.84	0.84	0.83	0.83	0.82	0.82	0.81	0.82	0.83	0.83	0.84	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 1.45 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

48.52	47.79	46.73	44.7	43.2	41.52	40.57	41.63	42.78	44.58	46.66	48.34	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

20.99	20.68	20.24	19.43	18.82	18.15	17.79	18.22	18.7	19.42	20.24	20.92	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

29.47	28.4	27.33	26.26	25.19	24.12	24.12	25.19	26.26	27.33	28.4	29.47	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 91.12 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

98.99	96.87	94.3	90.39	87.21	83.79	82.48	85.04	87.74	91.33	95.3	98.73	1092.16 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

156.77	137.95	144.94	123.73	117.4	103.03	99.75	105.3	108.19	123.93	135.78	154.59	1511.35 (45)

Distribution loss (46) = 0.15 x (45)

23.52	20.69	21.74	18.56	17.61	15.45	14.96	15.79	16.23	18.59	20.37	23.19	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b	0.6	(49)
Energy lost from water storage, kWh/day (48) x (49) =	0.84	(50)
b) If manufacturer's declared loss factor is not known :		
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/day	0	(54)
Enter (50) or (54) in (55)	0.84	(55)

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

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,
(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m
where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(57)

Primary circuit loss for each month from Table 3
modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26	(59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0	0	0	0	0	0	0	0	0	0	0	0	(61)

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

206.07	182.48	194.24	171.45	166.7	150.74	149.05	154.6	155.91	173.23	183.49	203.89	2091.84	(62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0	0	0	0	0	0	0	0	0	0	0	0	(63b)

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

0	0	0	0	0	0	0	0	0	0	0	0	(63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

206.07	182.48	194.24	171.45	166.7	150.74	149.05	154.6	155.91	173.23	183.49	203.89	2091.84	(64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0	0	0	0	0	0	0	0	0	0	0	0	(64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

91.57	81.49	87.63	79.31	78.48	72.43	72.61	74.45	74.14	80.65	83.32	90.84	(65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

72.47	72.47	72.47	72.47	72.47	72.47	72.47	72.47	72.47	72.47	72.47	72.47	(66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

63.34	70.13	63.34	65.45	63.34	65.45	63.34	63.34	65.45	63.34	65.45	63.34	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

125.58	126.88	123.6	116.61	107.78	99.49	93.95	92.64	95.93	102.92	111.74	120.04	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

30.25	30.25	30.25	30.25	30.25	30.25	30.25	30.25	30.25	30.25	30.25	30.25	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	(71)

Water heating gains (Table 5)

123.08	121.27	117.79	110.15	105.48	100.59	97.59	100.07	102.98	108.4	115.72	122.1	(72)

Total internal gains

356.73	363.02	349.46	336.95	321.34	310.27	299.62	300.8	309.1	319.4	337.65	350.22	(73)

6. Solar gains

Solar gains in watts, calculated for each month

96.36	166.06	232.29	296.34	339.71	340.67	327.02	294.15	254.39	184.9	115.77	82.24	(83)

Total gains – internal and solar (watts)

453.1	529.07	581.76	633.3	661.05	650.95	626.64	594.94	563.49	504.3	453.42	432.46	(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, ⍰1,m (see Table 9a)

0.86	0.79	0.71	0.59	0.46	0.33	0.24	0.26	0.4	0.63	0.79	0.87	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.94	20.22	20.51	20.77	20.92	20.98	21	20.99	20.96	20.77	20.35	19.89	(87)

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

20.21	20.21	20.22	20.23	20.23	20.24	20.24	20.24	20.24	20.23	20.23	20.22	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.84	0.77	0.69	0.56	0.43	0.29	0.2	0.22	0.36	0.59	0.77	0.86	(89)

Roof

Mean internal temperature in the rest of dwelling T2

19.26	19.53	19.8	20.05	20.17	20.23	20.24	20.24	20.21	20.05	19.66	19.22	(90)

Living area fraction 0.65 (91)

Mean internal temperature (for the whole dwelling)

19.7	19.98	20.26	20.52	20.66	20.72	20.73	20.73	20.7	20.52	20.11	19.66	(92)

Adjusted mean internal temperature:

19.7	19.98	20.26	20.52	20.66	20.72	20.73	20.73	20.7	20.52	20.11	19.66	(93)

8. Space heating requirement

Utilisation factor for gains,

0.83	0.77	0.69	0.58	0.45	0.31	0.22	0.24	0.39	0.6	0.77	0.84	(94)

Useful gains, mGm , W

376.65	406.53	402.27	364.2	295.16	204.56	139.45	145.49	218.93	305	347.78	365.36	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

542.98	530.2	482.25	401.28	308.43	207.52	140.13	146.44	225.17	341.6	450.61	538.46	(97)

Space heating requirement for each month

123.75	83.1	59.5	26.7	9.87	0	0	0	0	27.23	74.04	128.79	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

123.75	83.1	59.5	26.7	9.87	0	0	0	0	27.23	74.04	128.79	(98c)

Space heating requirement in kWh/m²/year 12.81 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	559.63	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2091.84	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	26.51	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside													89.07	(330a)
warm air heating system fans													0	(330b)
pump for solar water heating													0	(330g)
pump for storage WWHRS (see section G3.3)													0	(330h)
electricity use by heat interface unit													0	(330i)
Total electricity for pumps and fans													89.07	(331)
Electricity for lighting (calculated in Appendix L)													106.21	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling														
PV	6.39	10.9	19.19	25.64	30.78	29.89	29.32	25.89	20.3	13.84	7.55	5.26	224.96	(333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0	(334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0	(335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported														
PV	1.5	3.9	9.95	18.42	27.5	28.86	28.05	21.77	13.48	6.19	2.14	1.11	162.89	(333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0	(334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0	(335b)
Appendix Q items: annual energy													0	
energy saved													0	(336b)
energy used													0	(337b)
Total delivered energy for all uses													2846.76	

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		24.85	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		92.88	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	14.69	(349)
Electricity for lighting	0	17.51	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-46.2	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	195.73	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.81	(357)
SAP rating	86.81	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)	0	(361)
Heat efficiency of CHP unit (e.g. 50%)	0	(362)

	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			3.82	(372)
Total CO2 associated with heat networks			93.97	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			93.97	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			12.36	(378)
Electricity for lighting			15.33	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			72.38	(383)
Total CO2, kg/year			1.74	(384)
EI rating (section 14)			98.88	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			40.65	(472)
Total CO2 associated with heat networks			1035.62	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1035.62	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			134.74	(478)
Electricity for lighting			162.91	(479)
energy saved or generated				
energy saved or generated	0		-406.5	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			926.77	(383)
Dwelling CO2 Emission Rate			22.28	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:10

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	73 m^2
Site Reference	A16	Plot Reference	A16
Address	A16, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*14.79 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.47 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*79.18 kWh_{PE}/m^2*	
Dwelling primary energy	19.46 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*40.6 kWh/m^2*	
Dwelling fabric energy efficiency	39.8 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	0.1	Ground floor (0.1)	OK
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	46.02	0.15
Exposed wall: Stair	13.5	0.15
Exposed wall: Corridor	10.8	0.15
Ground floor: Ground floor	73.4	0.1 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	South East	N/A	1 **(!)**
2, Windows (1)	1.08	South East	0.7	1.2
3, Windows (1)	1.08	South East	0.7	1.2
4, Windows (1)	3.12	South East	0.7	1.2
5, Windows (1)	2.34	South West	0.7	1.2
6, Windows (1)	2.34	South West	0.7	1.2
7, Windows (1)	5.52	North West	0.7	1.2
8, Windows (1)	3.12	North West	0.7	1.2
9, Windows (1)	2.34	North West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.9 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A16
Dwelling Type: New Dwelling Design Stage

A16
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	73.4	(1a) x	2.6	(2a) =	190.84	(3a)
Total floor area TFA					73.4	(4)
Dwelling volume					190.84	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	2	2	(19)
Shelter factor		0.85	(20)

Infiltration rate incorporating shelter factor 0.13 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)	0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15	1.67	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

Effective air change rate from PCDB:

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	23.98		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	7.34	1468	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	10.55	984.48	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		166.82	(31)
Party Wall	0	0	(32)
Party floor		2936	(32a)
Party ceiling		2202	(32b)
Internal wall **		1117.8	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		44.03	(33)
Heat capacity Cm = ∑(A x k)		8708.28	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		118.64	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		8.35	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		8.35	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		52.38	(37)

Ventilation heat loss calculated monthly

16.22	16.02	15.82	14.82	14.61	13.61	13.61	13.41	14.01	14.61	15.02	15.42	(38)

Heat transfer coefficient, W/K

68.6	68.39	68.19	67.19	66.99	65.99	65.99	65.79	66.39	66.99	67.39	67.79	(39)

Heat loss parameter (HLP), W/m²K

0.93	0.93	0.93	0.92	0.91	0.9	0.9	0.9	0.9	0.91	0.92	0.92	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N	2.33	(42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

63.22	62.27	60.88	58.23	56.28	54.1	52.86	54.23	55.74	58.08	60.78	62.97	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

27.31	26.9	26.33	25.28	24.49	23.62	23.14	23.71	24.33	25.26	26.34	27.22	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

38.45	37.05	35.65	34.25	32.86	31.46	31.46	32.86	34.25	35.65	37.05	38.45	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J)	118.72	(43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

128.97	126.22	122.86	117.76	113.62	109.17	107.46	110.8	114.32	118.99	124.17	128.64	1422.99 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

204.26	179.73	188.84	161.21	152.96	134.24	129.96	137.19	140.97	161.47	176.91	201.41	1969.15 (45)

Distribution loss (46) = 0.15 x (45)

30.64	26.96	28.33	24.18	22.94	20.14	19.49	20.58	21.15	24.22	26.54	30.21	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel	0	(47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day):	1.4	(48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

253.56 224.26 238.14 208.92 202.26 181.95 179.26 186.49 188.68 210.78 224.62 250.72 2549.65 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

253.56 224.26 238.14 208.92 202.26 181.95 179.26 186.49 188.68 210.78 224.62 250.72 2549.65 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

107.36 95.39 102.23 91.77 90.3 82.8 82.65 85.06 85.04 93.13 96.99 106.41 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

103.45	114.53	103.45	106.9	103.45	106.9	103.45	103.45	106.9	103.45	106.9	103.45	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

205.1	207.23	201.86	190.45	176.03	162.49	153.44	151.31	156.67	168.09	182.5	196.05	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	(71)

Water heating gains (Table 5)

144.3	141.94	137.41	127.46	121.37	115.01	111.09	114.33	118.11	125.18	134.71	143.03	(72)

Total internal gains

510.73	521.59	500.61	482.69	458.74	442.28	425.87	426.97	439.57	454.6	482	500.41	(73)

6. Solar gains

Solar gains in watts, calculated for each month

107.04	191.31	285.62	393.9	477.7	490.3	466.02	401.05	322.73	217.88	129.85	90.55	(83)

Total gains – internal and solar (watts)

617.77	712.9	786.23	876.59	936.44	932.58	891.89	828.02	762.3	672.48	611.84	590.96	(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, ⍰1,m (see Table 9a)

0.94	0.9	0.85	0.74	0.6	0.44	0.32	0.36	0.55	0.79	0.9	0.94	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.48	19.78	20.14	20.56	20.83	20.96	20.99	20.98	20.9	20.55	19.97	19.44	(87)

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

20.14	20.14	20.14	20.15	20.16	20.17	20.17	20.17	20.16	20.16	20.15	20.15	(88)

Roof Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.93	0.89	0.83	0.71	0.56	0.38	0.26	0.3	0.5	0.75	0.89	0.94	(89)

Roof Mean internal temperature in the rest of dwelling T2

18.77	19.05	19.4	19.8	20.03	20.14	20.16	20.16	20.1	19.8	19.25	18.73	(90)

Living area fraction 0.37 (91)

Mean internal temperature (for the whole dwelling)

19.03	19.32	19.67	20.08	20.33	20.44	20.47	20.47	20.4	20.07	19.51	18.99	(92)

Adjusted mean internal temperature:

19.03	19.32	19.67	20.08	20.33	20.44	20.47	20.47	20.4	20.07	19.51	18.99	(93)

8. Space heating requirement

Utilisation factor for gains,

0.92	0.88	0.82	0.71	0.57	0.4	0.28	0.32	0.51	0.75	0.88	0.92	(94)

Useful gains, mGm , W

565.46	625.09	644.19	622.31	529.5	374.61	252.79	263.81	392.24	504.52	535.71	545.85	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

1010.45	986.06	898.34	751.33	578.04	385.64	255.25	267.5	418.13	634.67	836.51	1002.75	(97)

Space heating requirement for each month

331.07	242.57	189.09	92.89	36.11	0	0	0	0	96.83	216.58	339.94	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

331.07	242.57	189.09	92.89	36.11	0	0	0	0	96.83	216.58	339.94	(98c)

Space heating requirement in kWh/m²/year 21.05 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1622.34	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2549.65	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	41.72	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												157.16	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												157.16	(331)
Electricity for lighting (calculated in Appendix L)												173.47	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	11.16	18.93	33.12	43.95	52.44	50.78	49.81	44.12	34.82	23.93	13.15	9.19	385.41 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.77	7.2	18.3	33.81	50.41	52.9	51.43	39.98	24.8	11.42	3.96	2.06	299.04 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													4502.62

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		72.03	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		113.2	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	25.92	(349)
Electricity for lighting	0	28.61	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-80.27	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	251.49	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.76	(357)
SAP rating	87.6	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)		0	(361)
Heat efficiency of CHP unit (e.g. 50%)		0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year
Space heating from CHP		0	(363)
less credit emissions for electricity		0	(364)
Water heated by CHP		0	(365)
less credit emissions for electricity		0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Where the heat network is listed in the PCDB:				
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			6.12	(372)
Total CO2 associated with heat networks			147.97	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			147.97	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			21.8	(378)
Electricity for lighting			25.04	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			107.91	(383)
Total CO2, kg/year			1.47	(384)
EI rating (section 14)			98.78	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			64.38	(472)
Total CO2 associated with heat networks			1629.91	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1629.91	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			237.75	(478)
Electricity for lighting			266.08	(479)
energy saved or generated				
energy saved or generated	0		-705.52	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1428.22	(383)
Dwelling CO2 Emission Rate			19.46	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:12

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	59 m^2
Site Reference	A17	Plot Reference	A17
Address	A17, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*15.07 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.44 $kgCO_2/m^2$	**OK**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*80.93 kWh_{PE}/m^2*	
Dwelling primary energy	19.01 kWh_{PE}/m^2	**OK**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*35.7 kWh/m^2*	
Dwelling fabric energy efficiency	33.2 kWh/m^2	**OK**

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	**OK**
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.17	2 (1.2)	**OK**
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	40.11	0.15
Exposed wall: Stair	18.09	0.15
Exposed wall: Lift	8.64	0.15
Exposed wall: Corridor	8.64	0.15
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	East	N/A	1 **(!)**
2, Windows (1)	3.12	North	0.7	1.2
3, Windows (1)	3.12	North	0.7	1.2
4, Windows (1)	2.34	North	0.7	1.2
5, Windows (1)	2.34	North West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.72 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A17
Dwelling Type: New Dwelling Design Stage

A17
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	58.8	(1a) x	2.6	(2a) =	152.88	(3a)
Total floor area TFA					58.8	(4)
Dwelling volume					152.88	(5)

2. Ventilation Rate

Chimneys/Flues	0	x 80 =		0	(6a)
Open chimneys	0	x 20 =		0	(6b)
Chimneys / flues attached to closed fire	0	x 10 =		0	(6c)
Flues attached to solid fuel boiler	0	x 20 =		0	(6d)
Flues attached to other heater	0	x 35 =		0	(6e)
Number of blocked chimneys	0	x 20 =		0	(6f)
Number of intermittent extract fans	0	x 10 =		0	(7a)
Number of passive vents	0	x 10 =		0	(7b)
Number of flueless gas fires	0	x 40 =		0	(7c)
		Air changes per hour			
Number of storeys in the dwelling (ns)			0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc			0	0	(9)
Additional infiltration			0	0	(10)
Structural infiltration			0	0	(11)
Suspended wooden ground floor			0	0	(12)
No draught lobby			0	0	(13)
Percentage of windows and doors draught proofed			0	0	(14)
Window infiltration			0	0	(15)
Infiltration rate			0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)			3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)			0	0	(17a)
Air permeability value)			0.15	0.15	(18)
Number of sides on which dwelling is sheltered			2	2	(19)
Shelter factor				0.85	(20)

Infiltration rate incorporating shelter factor 0.13 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)	0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15	1.67	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

Effective air change rate from PCDB:

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	12.5		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	11.32	1056.72	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		88.56	(31)
Party Wall	0	0	(32)
Party floor		2352	(32a)
Party ceiling		1764	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		25.99	(33)
Heat capacity Cm = ∑(A x k)		5901.72	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		100.37	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		4.45	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		4.45	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		30.44	(37)

Ventilation heat loss calculated monthly

12.99	12.83	12.67	11.87	11.71	10.9	10.9	10.74	11.23	11.71	12.03	12.35	(38)

Heat transfer coefficient, W/K

43.43	43.27	43.11	42.3	42.14	41.34	41.34	41.18	41.66	42.14	42.47	42.79	(39)

Heat loss parameter (HLP), W/m²K

0.74	0.74	0.73	0.72	0.72	0.7	0.7	0.7	0.71	0.72	0.72	0.73	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 1.95 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

56.87	56.02	54.77	52.39	50.63	48.67	47.56	48.79	50.15	52.25	54.69	56.65	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

24.58	24.22	23.7	22.75	22.04	21.26	20.83	21.34	21.9	22.74	23.71	24.5	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

34.57	33.32	32.06	30.8	29.55	28.29	28.29	29.55	30.8	32.06	33.32	34.57	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 106.81 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

116.03	113.55	110.53	105.95	102.22	98.22	96.68	99.68	102.85	107.05	111.71	115.73	1280.18 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

183.76	161.69	169.89	145.03	137.61	120.77	116.92	123.42	126.82	145.27	159.15	181.2	1771.54 (45)

Distribution loss (46) = 0.15 x (45)

27.56	24.25	25.48	21.76	20.64	18.12	17.54	18.51	19.02	21.79	23.87	27.18	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

233.06 206.23 219.19 192.75 186.91 168.48 166.22 172.73 174.53 194.57 206.86 230.5 2352.03 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

233.06 206.23 219.19 192.75 186.91 168.48 166.22 172.73 174.53 194.57 206.86 230.5 2352.03 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

100.54 89.39 95.93 86.39 85.2 78.32 78.32 80.48 80.34 87.74 91.09 99.69 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

87.11	96.45	87.11	90.02	87.11	90.02	87.11	87.11	90.02	87.11	90.02	87.11	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

169.91	171.67	167.23	157.77	145.83	134.61	127.11	125.35	129.79	139.25	151.19	162.41	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	(71)

Water heating gains (Table 5)

135.14	133.02	128.94	119.99	114.51	108.78	105.27	108.17	111.58	117.94	126.51	133.99	(72)

Total internal gains

444.37	453.35	435.49	419.99	399.67	385.62	371.71	372.85	383.6	396.51	419.93	435.73	(73)

6. Solar gains

Solar gains in watts, calculated for each month

25.68	49.79	85.81	138.6	186.6	199.56	186.4	148.07	103.51	59.64	31.82	21.31	(83)

Total gains – internal and solar (watts)

470.05	503.14	521.31	558.59	586.27	585.18	558.11	520.91	487.12	456.16	451.75	457.04	(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, ⍰1,m (see Table 9a)

0.91	0.89	0.84	0.75	0.61	0.44	0.32	0.36	0.55	0.77	0.87	0.92	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.8	19.99	20.25	20.61	20.85	20.97	20.99	20.99	20.92	20.64	20.2	19.78	(87)

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

20.31	20.31	20.31	20.32	20.33	20.34	20.34	20.34	20.33	20.33	20.32	20.32	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.9	0.87	0.83	0.72	0.57	0.4	0.28	0.31	0.51	0.74	0.86	0.91	(89)

Roof

Mean internal temperature in the rest of dwelling T2

19.21	19.39	19.65	20	20.21	20.32	20.33	20.33	20.28	20.03	19.61	19.2	(90)

Living area fraction 0.45 (91)

Mean internal temperature (for the whole dwelling)

19.48	19.66	19.92	20.28	20.5	20.61	20.63	20.63	20.57	20.31	19.88	19.47	(92)

Adjusted mean internal temperature:

19.48	19.66	19.92	20.28	20.5	20.61	20.63	20.63	20.57	20.31	19.88	19.47	(93)

8. Space heating requirement

Utilisation factor for gains,

0.89	0.86	0.82	0.72	0.58	0.41	0.3	0.33	0.52	0.74	0.85	0.89	(94)

Useful gains, mGm , W

417.6	433.4	426.56	402.35	340.98	242.04	165.22	172.04	254.47	336.54	382.54	409.03	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

659.2	638.69	578.62	481.3	370.95	248.46	166.65	174.17	269.56	409.01	542.73	653.19	(97)

Space heating requirement for each month

179.75	137.95	113.13	56.84	22.29	0	0	0	0	53.92	115.34	181.66	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

179.75	137.95	113.13	56.84	22.29	0	0	0	0	53.92	115.34	181.66	(98c)

Space heating requirement in kWh/m²/year 14.64 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	903.92	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2352.03	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	32.56	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												125.9	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												125.9	(331)
Electricity for lighting (calculated in Appendix L)												146.08	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	8.97	15.25	26.75	35.6	42.59	41.29	40.5	35.83	28.2	19.32	10.58	7.38	312.27 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.17	5.65	14.39	26.61	39.69	41.66	40.49	31.46	19.49	8.97	3.1	1.62	235.29 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													3527.93

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		40.13	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		104.43	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	20.76	(349)
Electricity for lighting	0	24.09	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-64.65	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	216.77	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.75	(357)
SAP rating	87.81	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Where the heat network is listed in the PCDB:				
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			4.72	(372)
Total CO2 associated with heat networks			115.42	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			115.42	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			17.46	(378)
Electricity for lighting			21.08	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			84.43	(383)
Total CO2, kg/year			1.44	(384)
EI rating (section 14)			98.91	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			50.02	(472)
Total CO2 associated with heat networks			1271.82	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1271.82	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			190.46	(478)
Electricity for lighting			224.06	(479)
energy saved or generated				
energy saved or generated	0		-568.44	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1117.9	(383)
Dwelling CO2 Emission Rate			19.01	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:13

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	51 m^2
Site Reference	A28	Plot Reference	A28
Address	A28, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*14.35 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.31 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*77.33 kWh_{PE}/m^2*	
Dwelling primary energy	17.66 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*28.2 kWh/m^2*	
Dwelling fabric energy efficiency	26 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	0	PW (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.15	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	31.765	0.15
Exposed wall: Corridor	11.61	0.15
Party wall: PW	27.81	0 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North East	N/A	1 **(!)**
2, Windows (1)	0.845	North East	0.7	1.2
3, Windows (1)	3.12	North East	0.7	1.2
4, Windows (1)	2.34	North East	0.7	1.2
5, Windows (1)	1.08	South East	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.63 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A28
Dwelling Type: New Dwelling Design Stage

A28
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	50.9	(1a) x	2.6	(2a) =	132.34	(3a)
Total floor area TFA					50.9	(4)
Dwelling volume					132.34	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	2	2	(19)
Shelter factor		0.85	(20)

Infiltration rate incorporating shelter factor 0.13 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15	1.67	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

Effective air change rate from PCDB:

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	8.46		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	6.51	607.18	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		52.92	(31)
Party Wall	0	556.2	(32)
Party floor		2036	(32a)
Party ceiling		1527	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		17.13	(33)
Heat capacity Cm = ∑(A x k)		5455.38	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		107.18	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		2.65	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		2.65	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		19.78	(37)

Ventilation heat loss calculated monthly

	11.25	11.11	10.97	10.27	10.13	9.44	9.44	9.3	9.72	10.13	10.41	10.69	(38)

Heat transfer coefficient, W/K

	31.03	30.89	30.75	30.05	29.91	29.22	29.22	29.08	29.49	29.91	30.19	30.47	(39)

Heat loss parameter (HLP), W/m²K

	0.61	0.61	0.6	0.59	0.59	0.57	0.57	0.57	0.58	0.59	0.59	0.6	(40)

Number of days in month (Table 1a)

	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 1.72 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

	53	52.21	51.04	48.82	47.18	45.36	44.32	45.47	46.73	48.7	50.96	52.8	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

	22.92	22.58	22.1	21.21	20.55	19.82	19.42	19.9	20.41	21.2	22.1	22.84	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

	32.21	31.04	29.87	28.7	27.52	26.35	26.35	27.52	28.7	29.87	31.04	32.21	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 99.53 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

	108.13	105.82	103.01	98.73	95.26	91.53	90.09	92.89	95.84	99.76	104.1	107.85	1193.02 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

	171.25	150.68	158.32	135.16	128.24	112.54	108.96	115.02	118.19	135.38	148.32	168.86	1650.91 (45)

Distribution loss (46) = 0.15 x (45)

	25.69	22.6	23.75	20.27	19.24	16.88	16.34	17.25	17.73	20.31	22.25	25.33	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

220.55 195.22 207.62 182.87 177.54 160.26 158.26 164.32 165.9 184.68 196.03 218.16 2231.41 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

220.55 195.22 207.62 182.87 177.54 160.26 158.26 164.32 165.9 184.68 196.03 218.16 2231.41 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

96.38 85.73 92.08 83.11 82.08 75.59 75.67 77.69 77.47 84.45 87.48 95.59 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

80.3	88.91	80.3	82.98	80.3	82.98	80.3	80.3	82.98	80.3	82.98	80.3	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

149.57	151.12	147.21	138.89	128.37	118.5	111.9	110.34	114.26	122.58	133.09	142.97	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	(71)

Water heating gains (Table 5)

129.55	127.57	123.77	115.43	110.32	104.99	101.71	104.42	107.59	113.51	121.51	128.48	(72)

Total internal gains

408.17	416.35	400.03	386.04	367.75	355.21	342.66	343.81	353.58	365.15	386.33	400.5	(73)

6. Solar gains

Solar gains in watts, calculated for each month

24.22	46.41	77.21	118.65	153.88	162	152.34	124.65	91.34	54.99	29.95	20.12	(83)

Total gains – internal and solar (watts)

432.38	462.76	477.24	504.7	521.63	517.21	495	468.46	444.92	420.14	416.27	420.62	(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, ⍰1,m (see Table 9a)

0.88	0.84	0.78	0.66	0.52	0.36	0.26	0.28	0.45	0.68	0.82	0.88	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

20.35	20.49	20.66	20.86	20.96	20.99	21	21	20.98	20.87	20.62	20.34	(87)

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

20.42	20.42	20.43	20.44	20.44	20.45	20.45	20.46	20.45	20.44	20.44	20.43	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.86	0.82	0.76	0.64	0.49	0.33	0.23	0.25	0.42	0.65	0.8	0.87	(89)

Roof

Mean internal temperature in the rest of dwelling T2

19.83	19.96	20.13	20.32	20.41	20.45	20.45	20.46	20.44	20.34	20.11	19.83	(90)

Living area fraction 0.46 (91)

Mean internal temperature (for the whole dwelling)

20.06	20.2	20.37	20.57	20.66	20.7	20.7	20.7	20.69	20.58	20.34	20.06	(92)

Adjusted mean internal temperature:

20.06	20.2	20.37	20.57	20.66	20.7	20.7	20.7	20.69	20.58	20.34	20.06	(93)

8. Space heating requirement

Utilisation factor for gains,

0.86	0.82	0.76	0.64	0.5	0.34	0.24	0.27	0.43	0.66	0.8	0.86	(94)

Useful gains, mGm , W

370.15	378.88	363.97	325.18	260.76	177.14	119.67	124.86	191.43	275.53	331.42	363.24	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

489.09	472.65	426.49	350.66	268.03	178.15	119.84	125.11	194.25	298.57	399.79	483.26	(97)

Space heating requirement for each month

88.49	63.01	46.52	18.34	5.41	0	0	0	0	17.14	49.22	89.3	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

88.49	63.01	46.52	18.34	5.41	0	0	0	0	17.14	49.22	89.3	(98c)

Space heating requirement in kWh/m²/year 7.42 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	396.31	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2231.41	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	26.28	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												108.98	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												108.98	(331)
Electricity for lighting (calculated in Appendix L)												134.66	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	7.86	13.38	23.49	31.28	37.45	36.33	35.64	31.51	24.79	16.96	9.28	6.47	274.44 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	1.89	4.91	12.51	23.15	34.54	36.25	35.23	27.36	16.95	7.79	2.7	1.4	204.67 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													2871.36

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		17.6	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		99.07	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	17.97	(349)
Electricity for lighting	0	22.21	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-56.7	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	192.15	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.72	(357)
SAP rating	88.31	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)	0	(361)
Heat efficiency of CHP unit (e.g. 50%)	0	(362)

	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			3.76	(372)
Total CO2 associated with heat networks			93.11	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			93.11	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			15.12	(378)
Electricity for lighting			19.44	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			66.81	(383)
Total CO2, kg/year			1.31	(384)
EI rating (section 14)			99.07	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			40.2	(472)
Total CO2 associated with heat networks			1026.25	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1026.25	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			164.87	(478)
Electricity for lighting			206.54	(479)
energy saved or generated				
energy saved or generated	0		-498.62	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			899.05	(383)
Dwelling CO2 Emission Rate			17.66	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:14

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	42 m^2
Site Reference	A29	Plot Reference	A29
Address	A29, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*16.29 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.74 $kgCO_2/m^2$	**OK**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*87.94 kWh_{PE}/m^2*	
Dwelling primary energy	22.28 kWh_{PE}/m^2	**OK**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*30.9 kWh/m^2*	
Dwelling fabric energy efficiency	33.4 kWh/m^2	**FAIL**

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	**OK**
Party walls	*0.2*	0	PW (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.17	2 (1.2)	**OK**
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	34.44	0.15
Exposed wall: Corridor	5.67	0.15
Party wall: PW	27.81	0 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North East	N/A	1 **(!)**
2, Windows (1)	1.08	South East	0.7	1.2
3, Windows (1)	2.34	South West	0.7	1.2
4, Windows (1)	2.34	South West	0.7	1.2
5, Windows (1)	2.34	North East	0.7	1.2
6, Windows (1)	5.52	South West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.51 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A29
Dwelling Type: New Dwelling Design Stage

A29
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	41.6	(1a) x	2.6	(2a) =	108.16	(3a)
Total floor area TFA					41.6	(4)
Dwelling volume					108.16	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)
			Air changes per hour		
Number of storeys in the dwelling (ns)			0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc			0	0	(9)
Additional infiltration			0	0	(10)
Structural infiltration			0	0	(11)
Suspended wooden ground floor			0	0	(12)
No draught lobby			0	0	(13)
Percentage of windows and doors draught proofed			0	0	(14)
Window infiltration			0	0	(15)
Infiltration rate			0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)			3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)			0	0	(17a)
Air permeability value)			0.15	0.15	(18)
Number of sides on which dwelling is sheltered			3	3	(19)
Shelter factor				0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	15.6		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	6.02	561.54	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		55.89	(31)
Party Wall	0	556.2	(32)
Party floor		1664	(32a)
Party ceiling		1248	(32b)
Internal wall **		340.2	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		23.77	(33)
Heat capacity Cm = ∑(A x k)		4369.94	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		105.05	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		2.8	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		2.8	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		26.57	(37)

Ventilation heat loss calculated monthly

8.68	8.58	8.47	7.96	7.85	7.33	7.33	7.23	7.54	7.85	8.06	8.27	(38)

Heat transfer coefficient, W/K

35.25	35.15	35.05	34.53	34.42	33.9	33.9	33.8	34.11	34.42	34.63	34.84	(39)

Heat loss parameter (HLP), W/m²K

0.85	0.84	0.84	0.83	0.83	0.82	0.82	0.81	0.82	0.83	0.83	0.84	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 1.45 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

48.52	47.79	46.73	44.7	43.2	41.52	40.57	41.63	42.78	44.58	46.66	48.34	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

20.99	20.68	20.24	19.43	18.82	18.15	17.79	18.22	18.7	19.42	20.24	20.92	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

29.47	28.4	27.33	26.26	25.19	24.12	24.12	25.19	26.26	27.33	28.4	29.47	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 91.12 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

98.99	96.87	94.3	90.39	87.21	83.79	82.48	85.04	87.74	91.33	95.3	98.73	1092.16 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

156.77	137.95	144.94	123.73	117.4	103.03	99.75	105.3	108.19	123.93	135.78	154.59	1511.35 (45)

Distribution loss (46) = 0.15 x (45)

23.52	20.69	21.74	18.56	17.61	15.45	14.96	15.79	16.23	18.59	20.37	23.19	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b	0.6	(49)
Energy lost from water storage, kWh/day (48) x (49) =	0.84	(50)
b) If manufacturer's declared loss factor is not known :		
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/day	0	(54)
Enter (50) or (54) in (55)	0.84	(55)

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

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,
(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m
where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(57)

Primary circuit loss for each month from Table 3
modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26	(59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0	0	0	0	0	0	0	0	0	0	0	0	(61)

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

206.07	182.48	194.24	171.45	166.7	150.74	149.05	154.6	155.91	173.23	183.49	203.89	2091.84	(62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0	0	0	0	0	0	0	0	0	0	0	0	(63b)

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

0	0	0	0	0	0	0	0	0	0	0	0	(63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

206.07	182.48	194.24	171.45	166.7	150.74	149.05	154.6	155.91	173.23	183.49	203.89	2091.84	(64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0	0	0	0	0	0	0	0	0	0	0	0	(64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

91.57	81.49	87.63	79.31	78.48	72.43	72.61	74.45	74.14	80.65	83.32	90.84	(65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

72.47	72.47	72.47	72.47	72.47	72.47	72.47	72.47	72.47	72.47	72.47	72.47	(66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

63.34	70.13	63.34	65.45	63.34	65.45	63.34	63.34	65.45	63.34	65.45	63.34	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

125.58	126.88	123.6	116.61	107.78	99.49	93.95	92.64	95.93	102.92	111.74	120.04	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

30.25	30.25	30.25	30.25	30.25	30.25	30.25	30.25	30.25	30.25	30.25	30.25	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	(71)

Water heating gains (Table 5)

123.08	121.27	117.79	110.15	105.48	100.59	97.59	100.07	102.98	108.4	115.72	122.1	(72)

Total internal gains

356.73	363.02	349.46	336.95	321.34	310.27	299.62	300.8	309.1	319.4	337.65	350.22	(73)

6. Solar gains

Solar gains in watts, calculated for each month

96.36	166.06	232.29	296.34	339.71	340.67	327.02	294.15	254.39	184.9	115.77	82.24	(83)

Total gains – internal and solar (watts)

453.1	529.07	581.76	633.3	661.05	650.95	626.64	594.94	563.49	504.3	453.42	432.46	(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, ⍰1,m (see Table 9a)

0.86	0.79	0.71	0.59	0.46	0.33	0.24	0.26	0.4	0.63	0.79	0.87	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.94	20.22	20.51	20.77	20.92	20.98	21	20.99	20.96	20.77	20.35	19.89	(87)

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

20.21	20.21	20.22	20.23	20.23	20.24	20.24	20.24	20.24	20.23	20.23	20.22	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.84	0.77	0.69	0.56	0.43	0.29	0.2	0.22	0.36	0.59	0.77	0.86	(89)

Roof

Mean internal temperature in the rest of dwelling T2

19.26	19.53	19.8	20.05	20.17	20.23	20.24	20.24	20.21	20.05	19.66	19.22	(90)

Living area fraction 0.65 (91)

Mean internal temperature (for the whole dwelling)

19.7	19.98	20.26	20.52	20.66	20.72	20.73	20.73	20.7	20.52	20.11	19.66	(92)

Adjusted mean internal temperature:

19.7	19.98	20.26	20.52	20.66	20.72	20.73	20.73	20.7	20.52	20.11	19.66	(93)

8. Space heating requirement

Utilisation factor for gains,

0.83	0.77	0.69	0.58	0.45	0.31	0.22	0.24	0.39	0.6	0.77	0.84	(94)

Useful gains, mGm , W

376.65	406.53	402.27	364.2	295.16	204.56	139.45	145.49	218.93	305	347.78	365.36	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

542.98	530.2	482.25	401.28	308.43	207.52	140.13	146.44	225.17	341.6	450.61	538.46	(97)

Space heating requirement for each month

123.75	83.1	59.5	26.7	9.87	0	0	0	0	27.23	74.04	128.79	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

123.75	83.1	59.5	26.7	9.87	0	0	0	0	27.23	74.04	128.79	(98c)

Space heating requirement in kWh/m²/year 12.81 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	559.63	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2091.84	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	26.51	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside													89.07	(330a)
warm air heating system fans													0	(330b)
pump for solar water heating													0	(330g)
pump for storage WWHRS (see section G3.3)													0	(330h)
electricity use by heat interface unit													0	(330i)
Total electricity for pumps and fans													89.07	(331)
Electricity for lighting (calculated in Appendix L)													106.21	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling														
PV	6.39	10.9	19.19	25.64	30.78	29.89	29.32	25.89	20.3	13.84	7.55	5.26	224.96	(333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0	(334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0	(335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported														
PV	1.5	3.9	9.95	18.42	27.5	28.86	28.05	21.77	13.48	6.19	2.14	1.11	162.89	(333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0	(334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0	(335b)
Appendix Q items: annual energy													0	
energy saved													0	(336b)
energy used													0	(337b)
Total delivered energy for all uses													2846.76	

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		24.85	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		92.88	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	14.69	(349)
Electricity for lighting	0	17.51	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-46.2	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	195.73	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.81	(357)
SAP rating	86.81	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)	0	(361)
Heat efficiency of CHP unit (e.g. 50%)	0	(362)

	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			3.82	(372)
Total CO2 associated with heat networks			93.97	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			93.97	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			12.36	(378)
Electricity for lighting			15.33	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			72.38	(383)
Total CO2, kg/year			1.74	(384)
EI rating (section 14)			98.88	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			40.65	(472)
Total CO2 associated with heat networks			1035.62	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1035.62	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			134.74	(478)
Electricity for lighting			162.91	(479)
energy saved or generated				
energy saved or generated	0		-406.5	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			926.77	(383)
Dwelling CO2 Emission Rate			22.28	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:16

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	73 m^2
Site Reference	A210	Plot Reference	A210
Address	A210, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*14.79 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.47 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*79.18 kWh_{PE}/m^2*	
Dwelling primary energy	19.46 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*40.6 kWh/m^2*	
Dwelling fabric energy efficiency	39.8 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	0.1	Ground floor (0.1)	OK
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	46.02	0.15
Exposed wall: Stair	13.5	0.15
Exposed wall: Corridor	10.8	0.15
Ground floor: Ground floor	73.4	0.1 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	South East	N/A	1 **(!)**
2, Windows (1)	1.08	South East	0.7	1.2
3, Windows (1)	1.08	South East	0.7	1.2
4, Windows (1)	3.12	South East	0.7	1.2
5, Windows (1)	2.34	South West	0.7	1.2
6, Windows (1)	2.34	South West	0.7	1.2
7, Windows (1)	5.52	North West	0.7	1.2
8, Windows (1)	3.12	North West	0.7	1.2
9, Windows (1)	2.34	North West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.9 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A210
Dwelling Type: New Dwelling Design Stage

A210
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	73.4	(1a) x	2.6	(2a) =	190.84	(3a)
Total floor area TFA					73.4	(4)
Dwelling volume					190.84	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)
			Air changes per hour		
Number of storeys in the dwelling (ns)			0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc			0	0	(9)
Additional infiltration			0	0	(10)
Structural infiltration			0	0	(11)
Suspended wooden ground floor			0	0	(12)
No draught lobby			0	0	(13)
Percentage of windows and doors draught proofed			0	0	(14)
Window infiltration			0	0	(15)
Infiltration rate			0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)			3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)			0	0	(17a)
Air permeability value)			0.15	0.15	(18)
Number of sides on which dwelling is sheltered			2	2	(19)
Shelter factor				0.85	(20)

Infiltration rate incorporating shelter factor 0.13 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)	0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15	1.67	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

Effective air change rate from PCDB:

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	23.98		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	7.34	1468	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	10.55	984.48	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		166.82	(31)
Party Wall	0	0	(32)
Party floor		2936	(32a)
Party ceiling		2202	(32b)
Internal wall **		1117.8	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		44.03	(33)
Heat capacity Cm = ∑(A x k)		8708.28	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		118.64	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		8.35	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		8.35	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		52.38	(37)

Ventilation heat loss calculated monthly

16.22	16.02	15.82	14.82	14.61	13.61	13.61	13.41	14.01	14.61	15.02	15.42	(38)

Heat transfer coefficient, W/K

68.6	68.39	68.19	67.19	66.99	65.99	65.99	65.79	66.39	66.99	67.39	67.79	(39)

Heat loss parameter (HLP), W/m²K

0.93	0.93	0.93	0.92	0.91	0.9	0.9	0.9	0.9	0.91	0.92	0.92	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N	2.33	(42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

63.22	62.27	60.88	58.23	56.28	54.1	52.86	54.23	55.74	58.08	60.78	62.97	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

27.31	26.9	26.33	25.28	24.49	23.62	23.14	23.71	24.33	25.26	26.34	27.22	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

38.45	37.05	35.65	34.25	32.86	31.46	31.46	32.86	34.25	35.65	37.05	38.45	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J)	118.72	(43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

128.97	126.22	122.86	117.76	113.62	109.17	107.46	110.8	114.32	118.99	124.17	128.64	1422.99 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

204.26	179.73	188.84	161.21	152.96	134.24	129.96	137.19	140.97	161.47	176.91	201.41	1969.15 (45)

Distribution loss (46) = 0.15 x (45)

30.64	26.96	28.33	24.18	22.94	20.14	19.49	20.58	21.15	24.22	26.54	30.21	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel	0	(47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day):	1.4	(48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

253.56 224.26 238.14 208.92 202.26 181.95 179.26 186.49 188.68 210.78 224.62 250.72 2549.65 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

253.56 224.26 238.14 208.92 202.26 181.95 179.26 186.49 188.68 210.78 224.62 250.72 2549.65 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

107.36 95.39 102.23 91.77 90.3 82.8 82.65 85.06 85.04 93.13 96.99 106.41 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

103.45	114.53	103.45	106.9	103.45	106.9	103.45	103.45	106.9	103.45	106.9	103.45	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

205.1	207.23	201.86	190.45	176.03	162.49	153.44	151.31	156.67	168.09	182.5	196.05	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	(71)

Water heating gains (Table 5)

144.3	141.94	137.41	127.46	121.37	115.01	111.09	114.33	118.11	125.18	134.71	143.03	(72)

Total internal gains

510.73	521.59	500.61	482.69	458.74	442.28	425.87	426.97	439.57	454.6	482	500.41	(73)

6. Solar gains

Solar gains in watts, calculated for each month

107.04	191.31	285.62	393.9	477.7	490.3	466.02	401.05	322.73	217.88	129.85	90.55	(83)

Total gains – internal and solar (watts)

617.77	712.9	786.23	876.59	936.44	932.58	891.89	828.02	762.3	672.48	611.84	590.96	(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, ⍰1,m (see Table 9a)

0.94	0.9	0.85	0.74	0.6	0.44	0.32	0.36	0.55	0.79	0.9	0.94	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.48	19.78	20.14	20.56	20.83	20.96	20.99	20.98	20.9	20.55	19.97	19.44	(87)

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

20.14	20.14	20.14	20.15	20.16	20.17	20.17	20.17	20.16	20.16	20.15	20.15	(88)

Roof Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.93	0.89	0.83	0.71	0.56	0.38	0.26	0.3	0.5	0.75	0.89	0.94	(89)

Roof Mean internal temperature in the rest of dwelling T2

18.77	19.05	19.4	19.8	20.03	20.14	20.16	20.16	20.1	19.8	19.25	18.73	(90)

Living area fraction 0.37 (91)

Mean internal temperature (for the whole dwelling)

19.03	19.32	19.67	20.08	20.33	20.44	20.47	20.47	20.4	20.07	19.51	18.99	(92)

Adjusted mean internal temperature:

19.03	19.32	19.67	20.08	20.33	20.44	20.47	20.47	20.4	20.07	19.51	18.99	(93)

8. Space heating requirement

Utilisation factor for gains,

0.92	0.88	0.82	0.71	0.57	0.4	0.28	0.32	0.51	0.75	0.88	0.92	(94)

Useful gains, mGm , W

565.46	625.09	644.19	622.31	529.5	374.61	252.79	263.81	392.24	504.52	535.71	545.85	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

1010.45	986.06	898.34	751.33	578.04	385.64	255.25	267.5	418.13	634.67	836.51	1002.75	(97)

Space heating requirement for each month

331.07	242.57	189.09	92.89	36.11	0	0	0	0	96.83	216.58	339.94	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

331.07	242.57	189.09	92.89	36.11	0	0	0	0	96.83	216.58	339.94	(98c)

Space heating requirement in kWh/m²/year 21.05 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1622.34	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2549.65	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	41.72	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												157.16	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												157.16	(331)
Electricity for lighting (calculated in Appendix L)												173.47	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	11.16	18.93	33.12	43.95	52.44	50.78	49.81	44.12	34.82	23.93	13.15	9.19	385.41 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.77	7.2	18.3	33.81	50.41	52.9	51.43	39.98	24.8	11.42	3.96	2.06	299.04 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													4502.62

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		72.03	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		113.2	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	25.92	(349)
Electricity for lighting	0	28.61	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-80.27	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	251.49	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.76	(357)
SAP rating	87.6	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)		0	(361)
Heat efficiency of CHP unit (e.g. 50%)		0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year
Space heating from CHP		0	(363)
less credit emissions for electricity		0	(364)
Water heated by CHP		0	(365)
less credit emissions for electricity		0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Where the heat network is listed in the PCDB:				
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			6.12	(372)
Total CO2 associated with heat networks			147.97	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			147.97	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			21.8	(378)
Electricity for lighting			25.04	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			107.91	(383)
Total CO2, kg/year			1.47	(384)
EI rating (section 14)			98.78	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			64.38	(472)
Total CO2 associated with heat networks			1629.91	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1629.91	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			237.75	(478)
Electricity for lighting			266.08	(479)
energy saved or generated				
energy saved or generated	0		-705.52	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1428.22	(383)
Dwelling CO2 Emission Rate			19.46	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:18

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	59 m^2
Site Reference	A211	Plot Reference	A211
Address	A211, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*15.07 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.44 $kgCO_2/m^2$	**OK**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*80.93 kWh_{PE}/m^2*	
Dwelling primary energy	19.01 kWh_{PE}/m^2	**OK**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*35.7 kWh/m^2*	
Dwelling fabric energy efficiency	33.2 kWh/m^2	**OK**

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	**OK**
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.17	2 (1.2)	**OK**
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	40.11	0.15
Exposed wall: Stair	18.09	0.15
Exposed wall: Lift	8.64	0.15
Exposed wall: Corridor	8.64	0.15
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	East	N/A	1 **(!)**
2, Windows (1)	3.12	North	0.7	1.2
3, Windows (1)	3.12	North	0.7	1.2
4, Windows (1)	2.34	North	0.7	1.2
5, Windows (1)	2.34	North West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.72 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A211
Dwelling Type: New Dwelling Design Stage

A211
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	58.8	(1a) x	2.6	(2a) =	152.88	(3a)
Total floor area TFA					58.8	(4)
Dwelling volume					152.88	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)
			Air changes per hour		
Number of storeys in the dwelling (ns)			0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc			0	0	(9)
Additional infiltration			0	0	(10)
Structural infiltration			0	0	(11)
Suspended wooden ground floor			0	0	(12)
No draught lobby			0	0	(13)
Percentage of windows and doors draught proofed			0	0	(14)
Window infiltration			0	0	(15)
Infiltration rate			0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)			3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)			0	0	(17a)
Air permeability value)			0.15	0.15	(18)
Number of sides on which dwelling is sheltered			2	2	(19)
Shelter factor				0.85	(20)

Infiltration rate incorporating shelter factor 0.13 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)	0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15	1.67	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

Effective air change rate from PCDB:

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	12.5		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	11.32	1056.72	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		88.56	(31)
Party Wall	0	0	(32)
Party floor		2352	(32a)
Party ceiling		1764	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		25.99	(33)
Heat capacity Cm = ∑(A x k)		5901.72	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		100.37	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		4.45	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		4.45	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		30.44	(37)

Ventilation heat loss calculated monthly

12.99	12.83	12.67	11.87	11.71	10.9	10.9	10.74	11.23	11.71	12.03	12.35	(38)

Heat transfer coefficient, W/K

43.43	43.27	43.11	42.3	42.14	41.34	41.34	41.18	41.66	42.14	42.47	42.79	(39)

Heat loss parameter (HLP), W/m²K

0.74	0.74	0.73	0.72	0.72	0.7	0.7	0.7	0.71	0.72	0.72	0.73	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 1.95 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

56.87	56.02	54.77	52.39	50.63	48.67	47.56	48.79	50.15	52.25	54.69	56.65	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

24.58	24.22	23.7	22.75	22.04	21.26	20.83	21.34	21.9	22.74	23.71	24.5	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

34.57	33.32	32.06	30.8	29.55	28.29	28.29	29.55	30.8	32.06	33.32	34.57	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 106.81 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

116.03	113.55	110.53	105.95	102.22	98.22	96.68	99.68	102.85	107.05	111.71	115.73	1280.18 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

183.76	161.69	169.89	145.03	137.61	120.77	116.92	123.42	126.82	145.27	159.15	181.2	1771.54 (45)

Distribution loss (46) = 0.15 x (45)

27.56	24.25	25.48	21.76	20.64	18.12	17.54	18.51	19.02	21.79	23.87	27.18	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

233.06 206.23 219.19 192.75 186.91 168.48 166.22 172.73 174.53 194.57 206.86 230.5 2352.03 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

233.06 206.23 219.19 192.75 186.91 168.48 166.22 172.73 174.53 194.57 206.86 230.5 2352.03 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

100.54 89.39 95.93 86.39 85.2 78.32 78.32 80.48 80.34 87.74 91.09 99.69 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

87.11	96.45	87.11	90.02	87.11	90.02	87.11	87.11	90.02	87.11	90.02	87.11	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

169.91	171.67	167.23	157.77	145.83	134.61	127.11	125.35	129.79	139.25	151.19	162.41	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	(71)

Water heating gains (Table 5)

135.14	133.02	128.94	119.99	114.51	108.78	105.27	108.17	111.58	117.94	126.51	133.99	(72)

Total internal gains

444.37	453.35	435.49	419.99	399.67	385.62	371.71	372.85	383.6	396.51	419.93	435.73	(73)

6. Solar gains

Solar gains in watts, calculated for each month

25.68	49.79	85.81	138.6	186.6	199.56	186.4	148.07	103.51	59.64	31.82	21.31	(83)

Total gains – internal and solar (watts)

470.05	503.14	521.31	558.59	586.27	585.18	558.11	520.91	487.12	456.16	451.75	457.04	(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, ⍰1,m (see Table 9a)

0.91	0.89	0.84	0.75	0.61	0.44	0.32	0.36	0.55	0.77	0.87	0.92	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.8	19.99	20.25	20.61	20.85	20.97	20.99	20.99	20.92	20.64	20.2	19.78	(87)

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

20.31	20.31	20.31	20.32	20.33	20.34	20.34	20.34	20.33	20.33	20.32	20.32	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.9	0.87	0.83	0.72	0.57	0.4	0.28	0.31	0.51	0.74	0.86	0.91	(89)

Roof

Mean internal temperature in the rest of dwelling T2

19.21	19.39	19.65	20	20.21	20.32	20.33	20.33	20.28	20.03	19.61	19.2	(90)

Living area fraction 0.45 (91)

Mean internal temperature (for the whole dwelling)

19.48	19.66	19.92	20.28	20.5	20.61	20.63	20.63	20.57	20.31	19.88	19.47	(92)

Adjusted mean internal temperature:

19.48	19.66	19.92	20.28	20.5	20.61	20.63	20.63	20.57	20.31	19.88	19.47	(93)

8. Space heating requirement

Utilisation factor for gains,

0.89	0.86	0.82	0.72	0.58	0.41	0.3	0.33	0.52	0.74	0.85	0.89	(94)

Useful gains, mGm , W

417.6	433.4	426.56	402.35	340.98	242.04	165.22	172.04	254.47	336.54	382.54	409.03	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

659.2	638.69	578.62	481.3	370.95	248.46	166.65	174.17	269.56	409.01	542.73	653.19	(97)

Space heating requirement for each month

179.75	137.95	113.13	56.84	22.29	0	0	0	0	53.92	115.34	181.66	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

179.75	137.95	113.13	56.84	22.29	0	0	0	0	53.92	115.34	181.66	(98c)

Space heating requirement in kWh/m²/year 14.64 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	903.92	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2352.03	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	32.56	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												125.9	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												125.9	(331)
Electricity for lighting (calculated in Appendix L)												146.08	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	8.97	15.25	26.75	35.6	42.59	41.29	40.5	35.83	28.2	19.32	10.58	7.38	312.27 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.17	5.65	14.39	26.61	39.69	41.66	40.49	31.46	19.49	8.97	3.1	1.62	235.29 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													3527.93

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		40.13	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		104.43	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	20.76	(349)
Electricity for lighting	0	24.09	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-64.65	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	216.77	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.75	(357)
SAP rating	87.81	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Where the heat network is listed in the PCDB:				
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			4.72	(372)
Total CO2 associated with heat networks			115.42	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			115.42	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			17.46	(378)
Electricity for lighting			21.08	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			84.43	(383)
Total CO2, kg/year			1.44	(384)
EI rating (section 14)			98.91	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			50.02	(472)
Total CO2 associated with heat networks			1271.82	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1271.82	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			190.46	(478)
Electricity for lighting			224.06	(479)
energy saved or generated				
energy saved or generated	0		-568.44	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1117.9	(383)
Dwelling CO2 Emission Rate			19.01	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:20

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	51 m^2
Site Reference	A312	Plot Reference	A312
Address	A312, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*14.35 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.31 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*77.33 kWh_{PE}/m^2*	
Dwelling primary energy	17.66 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*28.2 kWh/m^2*	
Dwelling fabric energy efficiency	26 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	0	PW (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.15	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	31.765	0.15
Exposed wall: Corridor	11.61	0.15
Party wall: PW	27.81	0 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North East	N/A	1 **(!)**
2, Windows (1)	0.845	North East	0.7	1.2
3, Windows (1)	3.12	North East	0.7	1.2
4, Windows (1)	2.34	North East	0.7	1.2
5, Windows (1)	1.08	South East	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.63 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A312
Dwelling Type: New Dwelling Design Stage

A312
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	50.9	(1a) x	2.6	(2a) =	132.34	(3a)
Total floor area TFA					50.9	(4)
Dwelling volume					132.34	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	2	2	(19)
Shelter factor		0.85	(20)

Infiltration rate incorporating shelter factor 0.13 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15	1.67	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

Effective air change rate from PCDB:

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	8.46		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	6.51	607.18	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		52.92	(31)
Party Wall	0	556.2	(32)
Party floor		2036	(32a)
Party ceiling		1527	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		17.13	(33)
Heat capacity Cm = ∑(A x k)		5455.38	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		107.18	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		2.65	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		2.65	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		19.78	(37)

Ventilation heat loss calculated monthly

	11.25	11.11	10.97	10.27	10.13	9.44	9.44	9.3	9.72	10.13	10.41	10.69	(38)

Heat transfer coefficient, W/K

	31.03	30.89	30.75	30.05	29.91	29.22	29.22	29.08	29.49	29.91	30.19	30.47	(39)

Heat loss parameter (HLP), W/m²K

	0.61	0.61	0.6	0.59	0.59	0.57	0.57	0.57	0.58	0.59	0.59	0.6	(40)

Number of days in month (Table 1a)

	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 1.72 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

	53	52.21	51.04	48.82	47.18	45.36	44.32	45.47	46.73	48.7	50.96	52.8	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

	22.92	22.58	22.1	21.21	20.55	19.82	19.42	19.9	20.41	21.2	22.1	22.84	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

	32.21	31.04	29.87	28.7	27.52	26.35	26.35	27.52	28.7	29.87	31.04	32.21	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 99.53 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

	108.13	105.82	103.01	98.73	95.26	91.53	90.09	92.89	95.84	99.76	104.1	107.85	1193.02 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

	171.25	150.68	158.32	135.16	128.24	112.54	108.96	115.02	118.19	135.38	148.32	168.86	1650.91 (45)

Distribution loss (46) = 0.15 x (45)

	25.69	22.6	23.75	20.27	19.24	16.88	16.34	17.25	17.73	20.31	22.25	25.33	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

220.55 195.22 207.62 182.87 177.54 160.26 158.26 164.32 165.9 184.68 196.03 218.16 2231.41 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

220.55 195.22 207.62 182.87 177.54 160.26 158.26 164.32 165.9 184.68 196.03 218.16 2231.41 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

96.38 85.73 92.08 83.11 82.08 75.59 75.67 77.69 77.47 84.45 87.48 95.59 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

80.3	88.91	80.3	82.98	80.3	82.98	80.3	80.3	82.98	80.3	82.98	80.3	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

149.57	151.12	147.21	138.89	128.37	118.5	111.9	110.34	114.26	122.58	133.09	142.97	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	(71)

Water heating gains (Table 5)

129.55	127.57	123.77	115.43	110.32	104.99	101.71	104.42	107.59	113.51	121.51	128.48	(72)

Total internal gains

408.17	416.35	400.03	386.04	367.75	355.21	342.66	343.81	353.58	365.15	386.33	400.5	(73)

6. Solar gains

Solar gains in watts, calculated for each month

24.22	46.41	77.21	118.65	153.88	162	152.34	124.65	91.34	54.99	29.95	20.12	(83)

Total gains – internal and solar (watts)

432.38	462.76	477.24	504.7	521.63	517.21	495	468.46	444.92	420.14	416.27	420.62	(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, ⍰1,m (see Table 9a)

0.88	0.84	0.78	0.66	0.52	0.36	0.26	0.28	0.45	0.68	0.82	0.88	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

20.35	20.49	20.66	20.86	20.96	20.99	21	21	20.98	20.87	20.62	20.34	(87)

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

20.42	20.42	20.43	20.44	20.44	20.45	20.45	20.46	20.45	20.44	20.44	20.43	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.86	0.82	0.76	0.64	0.49	0.33	0.23	0.25	0.42	0.65	0.8	0.87	(89)

Roof

Mean internal temperature in the rest of dwelling T2

19.83	19.96	20.13	20.32	20.41	20.45	20.45	20.46	20.44	20.34	20.11	19.83	(90)

Living area fraction 0.46 (91)

Mean internal temperature (for the whole dwelling)

20.06	20.2	20.37	20.57	20.66	20.7	20.7	20.7	20.69	20.58	20.34	20.06	(92)

Adjusted mean internal temperature:

20.06	20.2	20.37	20.57	20.66	20.7	20.7	20.7	20.69	20.58	20.34	20.06	(93)

8. Space heating requirement

Utilisation factor for gains,

0.86	0.82	0.76	0.64	0.5	0.34	0.24	0.27	0.43	0.66	0.8	0.86	(94)

Useful gains, mGm , W

370.15	378.88	363.97	325.18	260.76	177.14	119.67	124.86	191.43	275.53	331.42	363.24	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

489.09	472.65	426.49	350.66	268.03	178.15	119.84	125.11	194.25	298.57	399.79	483.26	(97)

Space heating requirement for each month

88.49	63.01	46.52	18.34	5.41	0	0	0	0	17.14	49.22	89.3	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

88.49	63.01	46.52	18.34	5.41	0	0	0	0	17.14	49.22	89.3	(98c)

Space heating requirement in kWh/m²/year 7.42 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	396.31	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2231.41	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	26.28	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												108.98	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												108.98	(331)
Electricity for lighting (calculated in Appendix L)												134.66	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	7.86	13.38	23.49	31.28	37.45	36.33	35.64	31.51	24.79	16.96	9.28	6.47	274.44 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	1.89	4.91	12.51	23.15	34.54	36.25	35.23	27.36	16.95	7.79	2.7	1.4	204.67 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													2871.36

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		17.6	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		99.07	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	17.97	(349)
Electricity for lighting	0	22.21	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-56.7	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	192.15	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.72	(357)
SAP rating	88.31	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)	0	(361)
Heat efficiency of CHP unit (e.g. 50%)	0	(362)

	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			3.76	(372)
Total CO2 associated with heat networks			93.11	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			93.11	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			15.12	(378)
Electricity for lighting			19.44	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			66.81	(383)
Total CO2, kg/year			1.31	(384)
EI rating (section 14)			99.07	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			40.2	(472)
Total CO2 associated with heat networks			1026.25	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1026.25	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			164.87	(478)
Electricity for lighting			206.54	(479)
energy saved or generated				
energy saved or generated	0		-498.62	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			899.05	(383)
Dwelling CO2 Emission Rate			17.66	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:22

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	42 m^2
Site Reference	A313	Plot Reference	A313
Address	A313, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*16.29 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.74 $kgCO_2/m^2$	**OK**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*87.94 kWh_{PE}/m^2*	
Dwelling primary energy	22.28 kWh_{PE}/m^2	**OK**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*30.9 kWh/m^2*	
Dwelling fabric energy efficiency	33.4 kWh/m^2	**FAIL**

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	**OK**
Party walls	*0.2*	0	PW (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.17	2 (1.2)	**OK**
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	34.44	0.15
Exposed wall: Corridor	5.67	0.15
Party wall: PW	27.81	0 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North East	N/A	1 **(!)**
2, Windows (1)	1.08	South East	0.7	1.2
3, Windows (1)	2.34	South West	0.7	1.2
4, Windows (1)	2.34	South West	0.7	1.2
5, Windows (1)	2.34	North East	0.7	1.2
6, Windows (1)	5.52	South West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.51 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A313
Dwelling Type: New Dwelling Design Stage

A313
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	41.6	(1a) x	2.6	(2a) =	108.16	(3a)
Total floor area TFA					41.6	(4)
Dwelling volume					108.16	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)
			Air changes per hour		
Number of storeys in the dwelling (ns)			0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc			0	0	(9)
Additional infiltration			0	0	(10)
Structural infiltration			0	0	(11)
Suspended wooden ground floor			0	0	(12)
No draught lobby			0	0	(13)
Percentage of windows and doors draught proofed			0	0	(14)
Window infiltration			0	0	(15)
Infiltration rate			0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)			3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)			0	0	(17a)
Air permeability value)			0.15	0.15	(18)
Number of sides on which dwelling is sheltered			3	3	(19)
Shelter factor				0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	15.6		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	6.02	561.54	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		55.89	(31)
Party Wall	0	556.2	(32)
Party floor		1664	(32a)
Party ceiling		1248	(32b)
Internal wall **		340.2	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		23.77	(33)
Heat capacity Cm = ∑(A x k)		4369.94	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		105.05	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		2.8	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		2.8	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		26.57	(37)

Ventilation heat loss calculated monthly

8.68	8.58	8.47	7.96	7.85	7.33	7.33	7.23	7.54	7.85	8.06	8.27	(38)

Heat transfer coefficient, W/K

35.25	35.15	35.05	34.53	34.42	33.9	33.9	33.8	34.11	34.42	34.63	34.84	(39)

Heat loss parameter (HLP), W/m²K

0.85	0.84	0.84	0.83	0.83	0.82	0.82	0.81	0.82	0.83	0.83	0.84	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 1.45 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

48.52	47.79	46.73	44.7	43.2	41.52	40.57	41.63	42.78	44.58	46.66	48.34	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

20.99	20.68	20.24	19.43	18.82	18.15	17.79	18.22	18.7	19.42	20.24	20.92	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

29.47	28.4	27.33	26.26	25.19	24.12	24.12	25.19	26.26	27.33	28.4	29.47	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 91.12 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

98.99	96.87	94.3	90.39	87.21	83.79	82.48	85.04	87.74	91.33	95.3	98.73	1092.16 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

156.77	137.95	144.94	123.73	117.4	103.03	99.75	105.3	108.19	123.93	135.78	154.59	1511.35 (45)

Distribution loss (46) = 0.15 x (45)

23.52	20.69	21.74	18.56	17.61	15.45	14.96	15.79	16.23	18.59	20.37	23.19	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b	0.6	(49)
Energy lost from water storage, kWh/day (48) x (49) =	0.84	(50)
b) If manufacturer's declared loss factor is not known :		
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/day	0	(54)
Enter (50) or (54) in (55)	0.84	(55)

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

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,
(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m
where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(57)

Primary circuit loss for each month from Table 3
modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26	(59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0	0	0	0	0	0	0	0	0	0	0	0	(61)

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

206.07	182.48	194.24	171.45	166.7	150.74	149.05	154.6	155.91	173.23	183.49	203.89	2091.84	(62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0	0	0	0	0	0	0	0	0	0	0	0	(63b)

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

0	0	0	0	0	0	0	0	0	0	0	0	(63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

206.07	182.48	194.24	171.45	166.7	150.74	149.05	154.6	155.91	173.23	183.49	203.89	2091.84	(64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0	0	0	0	0	0	0	0	0	0	0	0	(64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

91.57	81.49	87.63	79.31	78.48	72.43	72.61	74.45	74.14	80.65	83.32	90.84	(65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

72.47	72.47	72.47	72.47	72.47	72.47	72.47	72.47	72.47	72.47	72.47	72.47	(66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

63.34	70.13	63.34	65.45	63.34	65.45	63.34	63.34	65.45	63.34	65.45	63.34	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

125.58	126.88	123.6	116.61	107.78	99.49	93.95	92.64	95.93	102.92	111.74	120.04	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

30.25	30.25	30.25	30.25	30.25	30.25	30.25	30.25	30.25	30.25	30.25	30.25	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	-57.98	(71)

Water heating gains (Table 5)

123.08	121.27	117.79	110.15	105.48	100.59	97.59	100.07	102.98	108.4	115.72	122.1	(72)

Total internal gains

356.73	363.02	349.46	336.95	321.34	310.27	299.62	300.8	309.1	319.4	337.65	350.22	(73)

6. Solar gains

Solar gains in watts, calculated for each month

96.36	166.06	232.29	296.34	339.71	340.67	327.02	294.15	254.39	184.9	115.77	82.24	(83)

Total gains – internal and solar (watts)

453.1	529.07	581.76	633.3	661.05	650.95	626.64	594.94	563.49	504.3	453.42	432.46	(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, ⍰1,m (see Table 9a)

0.86	0.79	0.71	0.59	0.46	0.33	0.24	0.26	0.4	0.63	0.79	0.87	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.94	20.22	20.51	20.77	20.92	20.98	21	20.99	20.96	20.77	20.35	19.89	(87)

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

20.21	20.21	20.22	20.23	20.23	20.24	20.24	20.24	20.24	20.23	20.23	20.22	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.84	0.77	0.69	0.56	0.43	0.29	0.2	0.22	0.36	0.59	0.77	0.86	(89)

Roof

Mean internal temperature in the rest of dwelling T2

19.26	19.53	19.8	20.05	20.17	20.23	20.24	20.24	20.21	20.05	19.66	19.22	(90)

Living area fraction 0.65 (91)

Mean internal temperature (for the whole dwelling)

19.7	19.98	20.26	20.52	20.66	20.72	20.73	20.73	20.7	20.52	20.11	19.66	(92)

Adjusted mean internal temperature:

19.7	19.98	20.26	20.52	20.66	20.72	20.73	20.73	20.7	20.52	20.11	19.66	(93)

8. Space heating requirement

Utilisation factor for gains,

0.83	0.77	0.69	0.58	0.45	0.31	0.22	0.24	0.39	0.6	0.77	0.84	(94)

Useful gains, mGm , W

376.65	406.53	402.27	364.2	295.16	204.56	139.45	145.49	218.93	305	347.78	365.36	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

542.98	530.2	482.25	401.28	308.43	207.52	140.13	146.44	225.17	341.6	450.61	538.46	(97)

Space heating requirement for each month

123.75	83.1	59.5	26.7	9.87	0	0	0	0	27.23	74.04	128.79	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

123.75	83.1	59.5	26.7	9.87	0	0	0	0	27.23	74.04	128.79	(98c)

Space heating requirement in kWh/m²/year 12.81 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	559.63	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2091.84	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	26.51	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside													89.07	(330a)
warm air heating system fans													0	(330b)
pump for solar water heating													0	(330g)
pump for storage WWHRS (see section G3.3)													0	(330h)
electricity use by heat interface unit													0	(330i)
Total electricity for pumps and fans													89.07	(331)
Electricity for lighting (calculated in Appendix L)													106.21	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling														
PV	6.39	10.9	19.19	25.64	30.78	29.89	29.32	25.89	20.3	13.84	7.55	5.26	224.96	(333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0	(334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0	(335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported														
PV	1.5	3.9	9.95	18.42	27.5	28.86	28.05	21.77	13.48	6.19	2.14	1.11	162.89	(333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0	(334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0	(335b)
Appendix Q items: annual energy													0	
energy saved													0	(336b)
energy used													0	(337b)
Total delivered energy for all uses													2846.76	

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		24.85	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		92.88	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	14.69	(349)
Electricity for lighting	0	17.51	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-46.2	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	195.73	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.81	(357)
SAP rating	86.81	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)	0	(361)
Heat efficiency of CHP unit (e.g. 50%)	0	(362)

	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			3.82	(372)
Total CO2 associated with heat networks			93.97	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			93.97	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			12.36	(378)
Electricity for lighting			15.33	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			72.38	(383)
Total CO2, kg/year			1.74	(384)
EI rating (section 14)			98.88	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			40.65	(472)
Total CO2 associated with heat networks			1035.62	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1035.62	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			134.74	(478)
Electricity for lighting			162.91	(479)
energy saved or generated				
energy saved or generated	0		-406.5	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			926.77	(383)
Dwelling CO2 Emission Rate			22.28	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:23

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	73 m^2
Site Reference	A314	Plot Reference	A314
Address	A314, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*14.79 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.47 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*79.18 kWh_{PE}/m^2*	
Dwelling primary energy	19.46 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*40.6 kWh/m^2*	
Dwelling fabric energy efficiency	39.8 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	0.1	Ground floor (0.1)	OK
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	46.02	0.15
Exposed wall: Stair	13.5	0.15
Exposed wall: Corridor	10.8	0.15
Ground floor: Ground floor	73.4	0.1 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	South East	N/A	1 **(!)**
2, Windows (1)	1.08	South East	0.7	1.2
3, Windows (1)	1.08	South East	0.7	1.2
4, Windows (1)	3.12	South East	0.7	1.2
5, Windows (1)	2.34	South West	0.7	1.2
6, Windows (1)	2.34	South West	0.7	1.2
7, Windows (1)	5.52	North West	0.7	1.2
8, Windows (1)	3.12	North West	0.7	1.2
9, Windows (1)	2.34	North West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.9 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A314
Dwelling Type: New Dwelling Design Stage

A314
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	73.4	(1a) x	2.6	(2a) =	190.84	(3a)
Total floor area TFA					73.4	(4)
Dwelling volume					190.84	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	2	2	(19)
Shelter factor		0.85	(20)

Infiltration rate incorporating shelter factor 0.13 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)	0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15	1.67	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

Effective air change rate from PCDB:

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	23.98		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	7.34	1468	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	10.55	984.48	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		166.82	(31)
Party Wall	0	0	(32)
Party floor		2936	(32a)
Party ceiling		2202	(32b)
Internal wall **		1117.8	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		44.03	(33)
Heat capacity Cm = ∑(A x k)		8708.28	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		118.64	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		8.35	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		8.35	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		52.38	(37)

Ventilation heat loss calculated monthly

16.22	16.02	15.82	14.82	14.61	13.61	13.61	13.41	14.01	14.61	15.02	15.42	(38)

Heat transfer coefficient, W/K

68.6	68.39	68.19	67.19	66.99	65.99	65.99	65.79	66.39	66.99	67.39	67.79	(39)

Heat loss parameter (HLP), W/m²K

0.93	0.93	0.93	0.92	0.91	0.9	0.9	0.9	0.9	0.91	0.92	0.92	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N	2.33	(42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

63.22	62.27	60.88	58.23	56.28	54.1	52.86	54.23	55.74	58.08	60.78	62.97	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

27.31	26.9	26.33	25.28	24.49	23.62	23.14	23.71	24.33	25.26	26.34	27.22	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

38.45	37.05	35.65	34.25	32.86	31.46	31.46	32.86	34.25	35.65	37.05	38.45	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J)	118.72	(43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

128.97	126.22	122.86	117.76	113.62	109.17	107.46	110.8	114.32	118.99	124.17	128.64	1422.99 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

204.26	179.73	188.84	161.21	152.96	134.24	129.96	137.19	140.97	161.47	176.91	201.41	1969.15 (45)

Distribution loss (46) = 0.15 x (45)

30.64	26.96	28.33	24.18	22.94	20.14	19.49	20.58	21.15	24.22	26.54	30.21	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel	0	(47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day):	1.4	(48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

253.56 224.26 238.14 208.92 202.26 181.95 179.26 186.49 188.68 210.78 224.62 250.72 2549.65 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

253.56 224.26 238.14 208.92 202.26 181.95 179.26 186.49 188.68 210.78 224.62 250.72 2549.65 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

107.36 95.39 102.23 91.77 90.3 82.8 82.65 85.06 85.04 93.13 96.99 106.41 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

103.45	114.53	103.45	106.9	103.45	106.9	103.45	103.45	106.9	103.45	106.9	103.45	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

205.1	207.23	201.86	190.45	176.03	162.49	153.44	151.31	156.67	168.09	182.5	196.05	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	(71)

Water heating gains (Table 5)

144.3	141.94	137.41	127.46	121.37	115.01	111.09	114.33	118.11	125.18	134.71	143.03	(72)

Total internal gains

510.73	521.59	500.61	482.69	458.74	442.28	425.87	426.97	439.57	454.6	482	500.41	(73)

6. Solar gains

Solar gains in watts, calculated for each month

107.04	191.31	285.62	393.9	477.7	490.3	466.02	401.05	322.73	217.88	129.85	90.55	(83)

Total gains – internal and solar (watts)

617.77	712.9	786.23	876.59	936.44	932.58	891.89	828.02	762.3	672.48	611.84	590.96	(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, ⍰1,m (see Table 9a)

0.94	0.9	0.85	0.74	0.6	0.44	0.32	0.36	0.55	0.79	0.9	0.94	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.48	19.78	20.14	20.56	20.83	20.96	20.99	20.98	20.9	20.55	19.97	19.44	(87)

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

20.14	20.14	20.14	20.15	20.16	20.17	20.17	20.17	20.16	20.16	20.15	20.15	(88)

Roof Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.93	0.89	0.83	0.71	0.56	0.38	0.26	0.3	0.5	0.75	0.89	0.94	(89)

Roof Mean internal temperature in the rest of dwelling T2

18.77	19.05	19.4	19.8	20.03	20.14	20.16	20.16	20.1	19.8	19.25	18.73	(90)

Living area fraction 0.37 (91)

Mean internal temperature (for the whole dwelling)

19.03	19.32	19.67	20.08	20.33	20.44	20.47	20.47	20.4	20.07	19.51	18.99	(92)

Adjusted mean internal temperature:

19.03	19.32	19.67	20.08	20.33	20.44	20.47	20.47	20.4	20.07	19.51	18.99	(93)

8. Space heating requirement

Utilisation factor for gains,

0.92	0.88	0.82	0.71	0.57	0.4	0.28	0.32	0.51	0.75	0.88	0.92	(94)

Useful gains, mGm , W

565.46	625.09	644.19	622.31	529.5	374.61	252.79	263.81	392.24	504.52	535.71	545.85	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

1010.45	986.06	898.34	751.33	578.04	385.64	255.25	267.5	418.13	634.67	836.51	1002.75	(97)

Space heating requirement for each month

331.07	242.57	189.09	92.89	36.11	0	0	0	0	96.83	216.58	339.94	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

331.07	242.57	189.09	92.89	36.11	0	0	0	0	96.83	216.58	339.94	(98c)

Space heating requirement in kWh/m²/year 21.05 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1622.34	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2549.65	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	41.72	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												157.16	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												157.16	(331)
Electricity for lighting (calculated in Appendix L)												173.47	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	11.16	18.93	33.12	43.95	52.44	50.78	49.81	44.12	34.82	23.93	13.15	9.19	385.41 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.77	7.2	18.3	33.81	50.41	52.9	51.43	39.98	24.8	11.42	3.96	2.06	299.04 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													4502.62

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		72.03	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		113.2	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	25.92	(349)
Electricity for lighting	0	28.61	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-80.27	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	251.49	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.76	(357)
SAP rating	87.6	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)		0	(361)
Heat efficiency of CHP unit (e.g. 50%)		0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year
Space heating from CHP		0	(363)
less credit emissions for electricity		0	(364)
Water heated by CHP		0	(365)
less credit emissions for electricity		0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Where the heat network is listed in the PCDB:				
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			6.12	(372)
Total CO2 associated with heat networks			147.97	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			147.97	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			21.8	(378)
Electricity for lighting			25.04	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			107.91	(383)
Total CO2, kg/year			1.47	(384)
EI rating (section 14)			98.78	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			64.38	(472)
Total CO2 associated with heat networks			1629.91	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1629.91	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			237.75	(478)
Electricity for lighting			266.08	(479)
energy saved or generated				
energy saved or generated	0		-705.52	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1428.22	(383)
Dwelling CO2 Emission Rate			19.46	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:25

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	59 m^2
Site Reference	A315	Plot Reference	A315
Address	A315, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*15.07 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.44 $kgCO_2/m^2$	**OK**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*80.93 kWh_{PE}/m^2*	
Dwelling primary energy	19.01 kWh_{PE}/m^2	**OK**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*35.7 kWh/m^2*	
Dwelling fabric energy efficiency	33.2 kWh/m^2	**OK**

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	**OK**
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.17	2 (1.2)	**OK**
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	40.11	0.15
Exposed wall: Stair	18.09	0.15
Exposed wall: Lift	8.64	0.15
Exposed wall: Corridor	8.64	0.15
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	East	N/A	1 **(!)**
2, Windows (1)	3.12	North	0.7	1.2
3, Windows (1)	3.12	North	0.7	1.2
4, Windows (1)	2.34	North	0.7	1.2
5, Windows (1)	2.34	North West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.72 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A315
Dwelling Type: New Dwelling Design Stage

A315
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	58.8	(1a) x	2.6	(2a) =	152.88	(3a)
Total floor area TFA					58.8	(4)
Dwelling volume					152.88	(5)

2. Ventilation Rate

Chimneys/Flues	0	x 80 =		0	(6a)
Open chimneys	0	x 20 =		0	(6b)
Chimneys / flues attached to closed fire	0	x 10 =		0	(6c)
Flues attached to solid fuel boiler	0	x 20 =		0	(6d)
Flues attached to other heater	0	x 35 =		0	(6e)
Number of blocked chimneys	0	x 20 =		0	(6f)
Number of intermittent extract fans	0	x 10 =		0	(7a)
Number of passive vents	0	x 10 =		0	(7b)
Number of flueless gas fires	0	x 40 =		0	(7c)
		Air changes per hour			
Number of storeys in the dwelling (ns)			0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc			0	0	(9)
Additional infiltration			0	0	(10)
Structural infiltration			0	0	(11)
Suspended wooden ground floor			0	0	(12)
No draught lobby			0	0	(13)
Percentage of windows and doors draught proofed			0	0	(14)
Window infiltration			0	0	(15)
Infiltration rate			0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)			3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)			0	0	(17a)
Air permeability value)			0.15	0.15	(18)
Number of sides on which dwelling is sheltered			2	2	(19)
Shelter factor				0.85	(20)

Infiltration rate incorporating shelter factor 0.13 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)	0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15	1.67	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

Effective air change rate from PCDB:

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	12.5		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	11.32	1056.72	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		88.56	(31)
Party Wall	0	0	(32)
Party floor		2352	(32a)
Party ceiling		1764	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		25.99	(33)
Heat capacity Cm = ∑(A x k)		5901.72	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		100.37	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		4.45	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		4.45	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		30.44	(37)

Ventilation heat loss calculated monthly

12.99	12.83	12.67	11.87	11.71	10.9	10.9	10.74	11.23	11.71	12.03	12.35	(38)

Heat transfer coefficient, W/K

43.43	43.27	43.11	42.3	42.14	41.34	41.34	41.18	41.66	42.14	42.47	42.79	(39)

Heat loss parameter (HLP), W/m²K

0.74	0.74	0.73	0.72	0.72	0.7	0.7	0.7	0.71	0.72	0.72	0.73	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 1.95 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

56.87	56.02	54.77	52.39	50.63	48.67	47.56	48.79	50.15	52.25	54.69	56.65	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

24.58	24.22	23.7	22.75	22.04	21.26	20.83	21.34	21.9	22.74	23.71	24.5	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

34.57	33.32	32.06	30.8	29.55	28.29	28.29	29.55	30.8	32.06	33.32	34.57	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 106.81 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

116.03	113.55	110.53	105.95	102.22	98.22	96.68	99.68	102.85	107.05	111.71	115.73	1280.18 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

183.76	161.69	169.89	145.03	137.61	120.77	116.92	123.42	126.82	145.27	159.15	181.2	1771.54 (45)

Distribution loss (46) = 0.15 x (45)

27.56	24.25	25.48	21.76	20.64	18.12	17.54	18.51	19.02	21.79	23.87	27.18	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

233.06 206.23 219.19 192.75 186.91 168.48 166.22 172.73 174.53 194.57 206.86 230.5 2352.03 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

233.06 206.23 219.19 192.75 186.91 168.48 166.22 172.73 174.53 194.57 206.86 230.5 2352.03 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

100.54 89.39 95.93 86.39 85.2 78.32 78.32 80.48 80.34 87.74 91.09 99.69 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

87.11	96.45	87.11	90.02	87.11	90.02	87.11	87.11	90.02	87.11	90.02	87.11	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

169.91	171.67	167.23	157.77	145.83	134.61	127.11	125.35	129.79	139.25	151.19	162.41	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	(71)

Water heating gains (Table 5)

135.14	133.02	128.94	119.99	114.51	108.78	105.27	108.17	111.58	117.94	126.51	133.99	(72)

Total internal gains

444.37	453.35	435.49	419.99	399.67	385.62	371.71	372.85	383.6	396.51	419.93	435.73	(73)

6. Solar gains

Solar gains in watts, calculated for each month

25.68	49.79	85.81	138.6	186.6	199.56	186.4	148.07	103.51	59.64	31.82	21.31	(83)

Total gains – internal and solar (watts)

470.05	503.14	521.31	558.59	586.27	585.18	558.11	520.91	487.12	456.16	451.75	457.04	(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, ⍰1,m (see Table 9a)

0.91	0.89	0.84	0.75	0.61	0.44	0.32	0.36	0.55	0.77	0.87	0.92	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.8	19.99	20.25	20.61	20.85	20.97	20.99	20.99	20.92	20.64	20.2	19.78	(87)

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

20.31	20.31	20.31	20.32	20.33	20.34	20.34	20.34	20.33	20.33	20.32	20.32	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.9	0.87	0.83	0.72	0.57	0.4	0.28	0.31	0.51	0.74	0.86	0.91	(89)

Roof

Mean internal temperature in the rest of dwelling T2

19.21	19.39	19.65	20	20.21	20.32	20.33	20.33	20.28	20.03	19.61	19.2	(90)

Living area fraction 0.45 (91)

Mean internal temperature (for the whole dwelling)

19.48	19.66	19.92	20.28	20.5	20.61	20.63	20.63	20.57	20.31	19.88	19.47	(92)

Adjusted mean internal temperature:

19.48	19.66	19.92	20.28	20.5	20.61	20.63	20.63	20.57	20.31	19.88	19.47	(93)

8. Space heating requirement

Utilisation factor for gains,

0.89	0.86	0.82	0.72	0.58	0.41	0.3	0.33	0.52	0.74	0.85	0.89	(94)

Useful gains, mGm , W

417.6	433.4	426.56	402.35	340.98	242.04	165.22	172.04	254.47	336.54	382.54	409.03	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

659.2	638.69	578.62	481.3	370.95	248.46	166.65	174.17	269.56	409.01	542.73	653.19	(97)

Space heating requirement for each month

179.75	137.95	113.13	56.84	22.29	0	0	0	0	53.92	115.34	181.66	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

179.75	137.95	113.13	56.84	22.29	0	0	0	0	53.92	115.34	181.66	(98c)

Space heating requirement in kWh/m²/year 14.64 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	903.92	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2352.03	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	32.56	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												125.9	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												125.9	(331)
Electricity for lighting (calculated in Appendix L)												146.08	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	8.97	15.25	26.75	35.6	42.59	41.29	40.5	35.83	28.2	19.32	10.58	7.38	312.27 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.17	5.65	14.39	26.61	39.69	41.66	40.49	31.46	19.49	8.97	3.1	1.62	235.29 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													3527.93

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		40.13	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		104.43	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	20.76	(349)
Electricity for lighting	0	24.09	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-64.65	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	216.77	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.75	(357)
SAP rating	87.81	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Where the heat network is listed in the PCDB:				
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			4.72	(372)
Total CO2 associated with heat networks			115.42	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			115.42	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			17.46	(378)
Electricity for lighting			21.08	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			84.43	(383)
Total CO2, kg/year			1.44	(384)
EI rating (section 14)			98.91	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			50.02	(472)
Total CO2 associated with heat networks			1271.82	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1271.82	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			190.46	(478)
Electricity for lighting			224.06	(479)
energy saved or generated				
energy saved or generated	0		-568.44	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1117.9	(383)
Dwelling CO2 Emission Rate			19.01	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:26

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	56 m^2
Site Reference	A416	Plot Reference	A416
Address	A416, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*14.34 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.44 $kgCO_2/m^2$	**OK**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*77.07 kWh_{PE}/m^2*	
Dwelling primary energy	19.1 kWh_{PE}/m^2	**OK**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*31.5 kWh/m^2*	
Dwelling fabric energy efficiency	33 kWh/m^2	**FAIL**

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	**OK**
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	**OK**
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	41.16	0.15
Exposed wall: Corridor	19.44	0.15
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	West	N/A	1 **(!)**
2, Windows (1)	2.34	North East	0.7	1.2
3, Windows (1)	2.34	North East	0.7	1.2
4, Windows (1)	3.12	North East	0.7	1.2
5, Windows (1)	3.12	South	0.7	1.2
6, Windows (1)	3.12	South	0.7	1.2
7, Windows (1)	3.12	South	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.55 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.69 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A416
Dwelling Type: New Dwelling Design Stage

A416
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	56.2	(1a) x	2.6	(2a) =	146.12	(3a)
Total floor area TFA					56.2	(4)
Dwelling volume					146.12	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)
			Air changes per hour		
Number of storeys in the dwelling (ns)			0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc			0	0	(9)
Additional infiltration			0	0	(10)
Structural infiltration			0	0	(11)
Suspended wooden ground floor			0	0	(12)
No draught lobby			0	0	(13)
Percentage of windows and doors draught proofed			0	0	(14)
Window infiltration			0	0	(15)
Infiltration rate			0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)			3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)			0	0	(17a)
Air permeability value)			0.15	0.15	(18)
Number of sides on which dwelling is sheltered			3	3	(19)
Shelter factor				0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	19.65		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	9.09	848.4	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		79.92	(31)
Party Wall	0	0	(32)
Party floor		2248	(32a)
Party ceiling		1686	(32b)
Internal wall **		1506.6	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		30.9	(33)
Heat capacity Cm = ∑(A x k)		6289	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		111.9	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		4	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		4	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		34.9	(37)

Ventilation heat loss calculated monthly

11.73	11.59	11.45	10.75	10.61	9.91	9.91	9.77	10.19	10.61	10.89	11.17	(38)

Heat transfer coefficient, W/K

46.63	46.49	46.35	45.65	45.51	44.8	44.8	44.66	45.09	45.51	45.79	46.07	(39)

Heat loss parameter (HLP), W/m²K

0.83	0.83	0.82	0.81	0.81	0.8	0.8	0.79	0.8	0.81	0.81	0.82	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N	1.87	(42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

55.61	54.78	53.56	51.23	49.51	47.59	46.5	47.71	49.04	51.1	53.48	55.4	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

24.04	23.68	23.18	22.25	21.56	20.79	20.37	20.87	21.42	22.24	23.19	23.96	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

33.81	32.58	31.35	30.12	28.89	27.66	27.66	28.89	30.12	31.35	32.58	33.81	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J)	104.44	(43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

113.46	111.04	108.09	103.6	99.96	96.04	94.53	97.47	100.57	104.68	109.24	113.16	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

179.69	158.11	166.12	141.82	134.56	118.09	114.33	120.69	124.01	142.05	155.63	177.19	(45)

Distribution loss (46) = 0.15 x (45)

26.95	23.72	24.92	21.27	20.18	17.71	17.15	18.1	18.6	21.31	23.34	26.58	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel	0	(47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day):	1.4	(48)

Temperature factor from Table 2b	0.6	(49)
Energy lost from water storage, kWh/day (48) x (49) =	0.84	(50)
b) If manufacturer's declared loss factor is not known :		
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/day	0	(54)
Enter (50) or (54) in (55)	0.84	(55)

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

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,
(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m
where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(57)

Primary circuit loss for each month from Table 3
modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26	(59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0	0	0	0	0	0	0	0	0	0	0	0	(61)

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

228.99	202.65	215.43	189.54	183.86	165.8	163.63	169.99	171.72	191.35	203.34	226.49	2312.8	(62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0	0	0	0	0	0	0	0	0	0	0	0	(63b)

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

0	0	0	0	0	0	0	0	0	0	0	0	(63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

228.99	202.65	215.43	189.54	183.86	165.8	163.63	169.99	171.72	191.35	203.34	226.49	2312.8	(64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0	0	0	0	0	0	0	0	0	0	0	0	(64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

99.19	88.2	94.68	85.33	84.18	77.44	77.46	79.57	79.4	86.67	89.92	98.36	(65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

93.62	93.62	93.62	93.62	93.62	93.62	93.62	93.62	93.62	93.62	93.62	93.62	(66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

82.35	91.18	82.35	85.1	82.35	85.1	82.35	82.35	85.1	82.35	85.1	82.35	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

163.27	164.97	160.7	151.61	140.13	129.35	122.15	120.45	124.72	133.81	145.28	156.07	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-74.9	-74.9	-74.9	-74.9	-74.9	-74.9	-74.9	-74.9	-74.9	-74.9	-74.9	-74.9	(71)

Water heating gains (Table 5)

133.32	131.25	127.26	118.51	113.15	107.55	104.11	106.95	110.28	116.5	124.88	132.2	(72)

Total internal gains

430.03	438.48	421.39	406.3	386.72	373.08	359.69	360.84	371.19	383.75	406.35	421.71	(73)

6. Solar gains

Solar gains in watts, calculated for each month

114.74	195.55	269.74	340.94	390.24	391.69	375.81	337.99	294.03	216.53	137.4	98.23	(83)

Total gains – internal and solar (watts)

544.77	634.03	691.13	747.24	776.97	764.78	735.51	698.83	665.22	600.28	543.76	519.94	(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, ⍰1,m (see Table 9a)

0.89	0.84	0.77	0.65	0.51	0.37	0.27	0.29	0.45	0.68	0.84	0.9	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.89	20.18	20.46	20.75	20.91	20.98	21	20.99	20.96	20.75	20.31	19.85	(87)

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

20.23	20.23	20.23	20.24	20.24	20.26	20.26	20.26	20.25	20.24	20.24	20.24	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.88	0.82	0.75	0.62	0.48	0.33	0.22	0.25	0.41	0.65	0.82	0.89	(89)

Roof

Mean internal temperature in the rest of dwelling T2

19.23	19.5	19.77	20.04	20.18	20.24	20.25	20.25	20.22	20.05	19.64	19.19	(90)

Living area fraction 0.53 (91)

Mean internal temperature (for the whole dwelling)

19.58	19.86	20.14	20.41	20.56	20.63	20.64	20.64	20.61	20.42	20	19.54	(92)

Adjusted mean internal temperature:

19.58	19.86	20.14	20.41	20.56	20.63	20.64	20.64	20.61	20.42	20	19.54	(93)

8. Space heating requirement

Utilisation factor for gains,

0.87	0.81	0.74	0.63	0.49	0.35	0.25	0.27	0.43	0.65	0.81	0.88	(94)

Useful gains, mGm , W

473.23	515.15	513.09	469.61	383.56	266.06	180.31	188.29	284.56	392.88	440.9	457.94	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

712.54	695.4	632.02	525.56	403.37	270.23	181.2	189.54	293.51	446.9	590.42	706.57	(97)

Space heating requirement for each month

178.05	121.12	88.48	40.29	14.74	0	0	0	0	40.19	107.66	184.98	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

178.05	121.12	88.48	40.29	14.74	0	0	0	0	40.19	107.66	184.98	(98c)

Space heating requirement in kWh/m²/year 13.8 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	814.28	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2312.8	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	31.27	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												122.56	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												122.56	(331)
Electricity for lighting (calculated in Appendix L)												138.1	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	8.6	14.63	25.66	34.17	40.89	39.65	38.89	34.39	27.06	18.53	10.15	7.08	299.69 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.08	5.4	13.76	25.45	37.97	39.84	38.73	30.09	18.64	8.58	2.97	1.55	225.05 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													3387.74

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		36.15	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		102.69	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	20.21	(349)
Electricity for lighting	0	22.77	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-62	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	211.83	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.75	(357)
SAP rating	87.79	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)	0	(361)
Heat efficiency of CHP unit (e.g. 50%)	0	(362)

	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			4.53	(372)
Total CO2 associated with heat networks			110.85	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			110.85	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			17	(378)
Electricity for lighting			19.93	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			81.14	(383)
Total CO2, kg/year			1.44	(384)
EI rating (section 14)			98.93	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			48.04	(472)
Total CO2 associated with heat networks			1221.48	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1221.48	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			185.41	(478)
Electricity for lighting			211.82	(479)
energy saved or generated				
energy saved or generated	0		-545.2	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1073.5	(383)
Dwelling CO2 Emission Rate			19.1	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:28

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	73 m^2
Site Reference	A417	Plot Reference	A417
Address	A417, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*13.02 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.23 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*69.69 kWh_{PE}/m^2*	
Dwelling primary energy	16.79 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*32.4 kWh/m^2*	
Dwelling fabric energy efficiency	32.8 kWh/m^2	FAIL

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	46.02	0.15
Exposed wall: Stair	13.5	0.15
Exposed wall: Corridor	10.8	0.15
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	South East	N/A	1 **(!)**
2, Windows (1)	1.08	South East	0.7	1.2
3, Windows (1)	1.08	South East	0.7	1.2
4, Windows (1)	3.12	South East	0.7	1.2
5, Windows (1)	2.34	South West	0.7	1.2
6, Windows (1)	2.34	South West	0.7	1.2
7, Windows (1)	5.52	North West	0.7	1.2
8, Windows (1)	3.12	North West	0.7	1.2
9, Windows (1)	2.34	North West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.9 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A417
Dwelling Type: New Dwelling Design Stage

A417
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	73.4	(1a) x	2.6	(2a) =	190.84	(3a)
Total floor area TFA					73.4	(4)
Dwelling volume					190.84	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	2	2	(19)
Shelter factor		0.85	(20)

Infiltration rate incorporating shelter factor 0.13 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)	0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15	1.67	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

Effective air change rate from PCDB:

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	23.98		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	10.55	984.48	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		93.42	(31)
Party Wall	0	0	(32)
Party floor		2936	(32a)
Party ceiling		2202	(32b)
Internal wall **		1117.8	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		36.69	(33)
Heat capacity Cm = ∑(A x k)		7240.28	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		98.64	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		4.65	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		4.65	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		41.34	(37)

Ventilation heat loss calculated monthly

16.22	16.02	15.82	14.82	14.61	13.61	13.61	13.41	14.01	14.61	15.02	15.42	(38)

Heat transfer coefficient, W/K

57.56	57.35	57.15	56.15	55.95	54.95	54.95	54.75	55.35	55.95	56.35	56.75	(39)

Heat loss parameter (HLP), W/m²K

0.78	0.78	0.78	0.76	0.76	0.75	0.75	0.75	0.75	0.76	0.77	0.77	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 2.33 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

63.22	62.27	60.88	58.23	56.28	54.1	52.86	54.23	55.74	58.08	60.78	62.97	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

27.31	26.9	26.33	25.28	24.49	23.62	23.14	23.71	24.33	25.26	26.34	27.22	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

38.45	37.05	35.65	34.25	32.86	31.46	31.46	32.86	34.25	35.65	37.05	38.45	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 118.72 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

128.97	126.22	122.86	117.76	113.62	109.17	107.46	110.8	114.32	118.99	124.17	128.64	1422.99	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

204.26	179.73	188.84	161.21	152.96	134.24	129.96	137.19	140.97	161.47	176.91	201.41	1969.15	(45)

Distribution loss (46) = 0.15 x (45)

30.64	26.96	28.33	24.18	22.94	20.14	19.49	20.58	21.15	24.22	26.54	30.21	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

253.56 224.26 238.14 208.92 202.26 181.95 179.26 186.49 188.68 210.78 224.62 250.72 2549.65 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

253.56 224.26 238.14 208.92 202.26 181.95 179.26 186.49 188.68 210.78 224.62 250.72 2549.65 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

107.36 95.39 102.23 91.77 90.3 82.8 82.65 85.06 85.04 93.13 96.99 106.41 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

103.45	114.53	103.45	106.9	103.45	106.9	103.45	103.45	106.9	103.45	106.9	103.45	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

205.1	207.23	201.86	190.45	176.03	162.49	153.44	151.31	156.67	168.09	182.5	196.05	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	(71)

Water heating gains (Table 5)

144.3	141.94	137.41	127.46	121.37	115.01	111.09	114.33	118.11	125.18	134.71	143.03	(72)

Total internal gains

510.73	521.59	500.61	482.69	458.74	442.28	425.87	426.97	439.57	454.6	482	500.41	(73)

6. Solar gains

Solar gains in watts, calculated for each month

107.04	191.31	285.62	393.9	477.7	490.3	466.02	401.05	322.73	217.88	129.85	90.55	(83)

Total gains – internal and solar (watts)

617.77	712.9	786.23	876.59	936.44	932.58	891.89	828.02	762.3	672.48	611.84	590.96	(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, 1,m (see Table 9a)

0.9	0.86	0.79	0.67	0.52	0.37	0.27	0.3	0.48	0.71	0.86	0.91	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.71	20	20.33	20.69	20.89	20.97	20.99	20.99	20.94	20.67	20.16	19.67	(87)

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

20.27	20.27	20.27	20.28	20.29	20.3	20.3	20.3	20.29	20.29	20.28	20.28	(88)

Roof Utilisation factor for gains for rest of dwelling, 2,m (see Table 9a)

0.89	0.84	0.77	0.64	0.49	0.33	0.23	0.26	0.43	0.68	0.84	0.9	(89)

Roof Mean internal temperature in the rest of dwelling T2

19.09	19.37	19.69	20.03	20.2	20.28	20.29	20.3	20.25	20.02	19.54	19.06	(90)

Living area fraction 0.37 (91)

Mean internal temperature (for the whole dwelling)

19.32	19.6	19.93	20.27	20.46	20.54	20.55	20.55	20.51	20.26	19.77	19.28	(92)

Adjusted mean internal temperature:

19.32	19.6	19.93	20.27	20.46	20.54	20.55	20.55	20.51	20.26	19.77	19.28	(93)

8. Space heating requirement

Utilisation factor for gains,

0.88	0.83	0.76	0.64	0.49	0.34	0.24	0.27	0.45	0.68	0.83	0.89	(94)

Useful gains, mGm , W

542.6	591.25	597.88	559.62	462.47	320.49	215.92	225.4	340.26	458.64	506.13	525.25	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

864.29	843.15	767.31	638.55	489.94	326.26	217.2	227.31	354.55	540.43	714	855.89	(97)

Space heating requirement for each month

239.34	169.27	126.06	56.83	20.44	0	0	0	0	60.85	149.66	245.99	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

239.34	169.27	126.06	56.83	20.44	0	0	0	0	60.85	149.66	245.99	(98c)

Space heating requirement in kWh/m²/year 14.56 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1121.87	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2549.65	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	36.72	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												157.16	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												157.16	(331)
Electricity for lighting (calculated in Appendix L)												173.47	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	11.16	18.93	33.12	43.95	52.44	50.78	49.81	44.12	34.82	23.93	13.15	9.19	385.41 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.77	7.2	18.3	33.81	50.41	52.9	51.43	39.98	24.8	11.42	3.96	2.06	299.04 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													4002.15

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		49.81	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		113.2	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	25.92	(349)
Electricity for lighting	0	28.61	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-80.27	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	229.27	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.7	(357)
SAP rating	88.7	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			5.35	(372)
Total CO2 associated with heat networks			130.18	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			130.18	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			21.8	(378)
Electricity for lighting			25.04	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			90.12	(383)
Total CO2, kg/year			1.23	(384)
EI rating (section 14)			98.98	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			56.5	(472)
Total CO2 associated with heat networks			1434.24	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1434.24	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			237.75	(478)
Electricity for lighting			266.08	(479)
energy saved or generated				
energy saved or generated	0		-705.52	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1232.54	(383)
Dwelling CO2 Emission Rate			16.79	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:29

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	59 m^2
Site Reference	A418	Plot Reference	A418
Address	A418, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*15.07 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.44 $kgCO_2/m^2$	**OK**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*80.93 kWh_{PE}/m^2*	
Dwelling primary energy	19.01 kWh_{PE}/m^2	**OK**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*35.7 kWh/m^2*	
Dwelling fabric energy efficiency	33.2 kWh/m^2	**OK**

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	**OK**
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.17	2 (1.2)	**OK**
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	40.11	0.15
Exposed wall: Stair	18.09	0.15
Exposed wall: Lift	8.64	0.15
Exposed wall: Corridor	8.64	0.15
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	East	N/A	1 **(!)**
2, Windows (1)	3.12	North	0.7	1.2
3, Windows (1)	3.12	North	0.7	1.2
4, Windows (1)	2.34	North	0.7	1.2
5, Windows (1)	2.34	North West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.72 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A418
Dwelling Type: New Dwelling Design Stage

A418
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	58.8	(1a) x	2.6	(2a) =	152.88	(3a)
Total floor area TFA					58.8	(4)
Dwelling volume					152.88	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)
			Air changes per hour		
Number of storeys in the dwelling (ns)			0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc			0	0	(9)
Additional infiltration			0	0	(10)
Structural infiltration			0	0	(11)
Suspended wooden ground floor			0	0	(12)
No draught lobby			0	0	(13)
Percentage of windows and doors draught proofed			0	0	(14)
Window infiltration			0	0	(15)
Infiltration rate			0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)			3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)			0	0	(17a)
Air permeability value)			0.15	0.15	(18)
Number of sides on which dwelling is sheltered			2	2	(19)
Shelter factor				0.85	(20)

Infiltration rate incorporating shelter factor 0.13 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)	0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15	1.67	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

Effective air change rate from PCDB:

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	12.5		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	11.32	1056.72	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		88.56	(31)
Party Wall	0	0	(32)
Party floor		2352	(32a)
Party ceiling		1764	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		25.99	(33)
Heat capacity Cm = ∑(A x k)		5901.72	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		100.37	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		4.45	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		4.45	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		30.44	(37)

Ventilation heat loss calculated monthly

12.99	12.83	12.67	11.87	11.71	10.9	10.9	10.74	11.23	11.71	12.03	12.35	(38)

Heat transfer coefficient, W/K

43.43	43.27	43.11	42.3	42.14	41.34	41.34	41.18	41.66	42.14	42.47	42.79	(39)

Heat loss parameter (HLP), W/m²K

0.74	0.74	0.73	0.72	0.72	0.7	0.7	0.7	0.71	0.72	0.72	0.73	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 1.95 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

56.87	56.02	54.77	52.39	50.63	48.67	47.56	48.79	50.15	52.25	54.69	56.65	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

24.58	24.22	23.7	22.75	22.04	21.26	20.83	21.34	21.9	22.74	23.71	24.5	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

34.57	33.32	32.06	30.8	29.55	28.29	28.29	29.55	30.8	32.06	33.32	34.57	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 106.81 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

116.03	113.55	110.53	105.95	102.22	98.22	96.68	99.68	102.85	107.05	111.71	115.73	1280.18 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

183.76	161.69	169.89	145.03	137.61	120.77	116.92	123.42	126.82	145.27	159.15	181.2	1771.54 (45)

Distribution loss (46) = 0.15 x (45)

27.56	24.25	25.48	21.76	20.64	18.12	17.54	18.51	19.02	21.79	23.87	27.18	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

233.06 206.23 219.19 192.75 186.91 168.48 166.22 172.73 174.53 194.57 206.86 230.5 2352.03 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

233.06 206.23 219.19 192.75 186.91 168.48 166.22 172.73 174.53 194.57 206.86 230.5 2352.03 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

100.54 89.39 95.93 86.39 85.2 78.32 78.32 80.48 80.34 87.74 91.09 99.69 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

87.11	96.45	87.11	90.02	87.11	90.02	87.11	87.11	90.02	87.11	90.02	87.11	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

169.91	171.67	167.23	157.77	145.83	134.61	127.11	125.35	129.79	139.25	151.19	162.41	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	(71)

Water heating gains (Table 5)

135.14	133.02	128.94	119.99	114.51	108.78	105.27	108.17	111.58	117.94	126.51	133.99	(72)

Total internal gains

444.37	453.35	435.49	419.99	399.67	385.62	371.71	372.85	383.6	396.51	419.93	435.73	(73)

6. Solar gains

Solar gains in watts, calculated for each month

25.68	49.79	85.81	138.6	186.6	199.56	186.4	148.07	103.51	59.64	31.82	21.31	(83)

Total gains – internal and solar (watts)

470.05	503.14	521.31	558.59	586.27	585.18	558.11	520.91	487.12	456.16	451.75	457.04	(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, ⍰1,m (see Table 9a)

0.91	0.89	0.84	0.75	0.61	0.44	0.32	0.36	0.55	0.77	0.87	0.92	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.8	19.99	20.25	20.61	20.85	20.97	20.99	20.99	20.92	20.64	20.2	19.78	(87)

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

20.31	20.31	20.31	20.32	20.33	20.34	20.34	20.34	20.33	20.33	20.32	20.32	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.9	0.87	0.83	0.72	0.57	0.4	0.28	0.31	0.51	0.74	0.86	0.91	(89)

Roof

Mean internal temperature in the rest of dwelling T2

19.21	19.39	19.65	20	20.21	20.32	20.33	20.33	20.28	20.03	19.61	19.2	(90)

Living area fraction 0.45 (91)

Mean internal temperature (for the whole dwelling)

19.48	19.66	19.92	20.28	20.5	20.61	20.63	20.63	20.57	20.31	19.88	19.47	(92)

Adjusted mean internal temperature:

19.48	19.66	19.92	20.28	20.5	20.61	20.63	20.63	20.57	20.31	19.88	19.47	(93)

8. Space heating requirement

Utilisation factor for gains,

0.89	0.86	0.82	0.72	0.58	0.41	0.3	0.33	0.52	0.74	0.85	0.89	(94)

Useful gains, mGm , W

417.6	433.4	426.56	402.35	340.98	242.04	165.22	172.04	254.47	336.54	382.54	409.03	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

659.2	638.69	578.62	481.3	370.95	248.46	166.65	174.17	269.56	409.01	542.73	653.19	(97)

Space heating requirement for each month

179.75	137.95	113.13	56.84	22.29	0	0	0	0	53.92	115.34	181.66	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

179.75	137.95	113.13	56.84	22.29	0	0	0	0	53.92	115.34	181.66	(98c)

Space heating requirement in kWh/m²/year 14.64 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	903.92	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2352.03	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	32.56	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												125.9	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												125.9	(331)
Electricity for lighting (calculated in Appendix L)												146.08	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	8.97	15.25	26.75	35.6	42.59	41.29	40.5	35.83	28.2	19.32	10.58	7.38	312.27 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.17	5.65	14.39	26.61	39.69	41.66	40.49	31.46	19.49	8.97	3.1	1.62	235.29 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													3527.93

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		40.13	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		104.43	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	20.76	(349)
Electricity for lighting	0	24.09	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-64.65	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	216.77	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.75	(357)
SAP rating	87.81	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Where the heat network is listed in the PCDB:				
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			4.72	(372)
Total CO2 associated with heat networks			115.42	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			115.42	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			17.46	(378)
Electricity for lighting			21.08	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			84.43	(383)
Total CO2, kg/year			1.44	(384)
EI rating (section 14)			98.91	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			50.02	(472)
Total CO2 associated with heat networks			1271.82	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1271.82	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			190.46	(478)
Electricity for lighting			224.06	(479)
energy saved or generated				
energy saved or generated	0		-568.44	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1117.9	(383)
Dwelling CO2 Emission Rate			19.01	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:31

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	56 m^2
Site Reference	A519	Plot Reference	A519
Address	A519, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*16.04 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.74 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*86.2 kWh_{PE}/m^2*	
Dwelling primary energy	22.31 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*39.2 kWh/m^2*	
Dwelling fabric energy efficiency	40.2 kWh/m^2	FAIL

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	0.1	Flat roof (0.1)	OK
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	41.16	0.15
Exposed wall: Corridor	19.44	0.15
Exposed roof: Flat roof	56.2	0.1 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	West	N/A	1 **(!)**
2, Windows (1)	2.34	North East	0.7	1.2
3, Windows (1)	2.34	North East	0.7	1.2
4, Windows (1)	3.12	North East	0.7	1.2
5, Windows (1)	3.12	South	0.7	1.2
6, Windows (1)	3.12	South	0.7	1.2
7, Windows (1)	3.12	South	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.55 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.69 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A519
Dwelling Type: New Dwelling Design Stage

A519
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	56.2	(1a) x	2.6	(2a) =	146.12	(3a)
Total floor area TFA					56.2	(4)
Dwelling volume					146.12	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)
			Air changes per hour		
Number of storeys in the dwelling (ns)			0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc			0	0	(9)
Additional infiltration			0	0	(10)
Structural infiltration			0	0	(11)
Suspended wooden ground floor			0	0	(12)
No draught lobby			0	0	(13)
Percentage of windows and doors draught proofed			0	0	(14)
Window infiltration			0	0	(15)
Infiltration rate			0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)			3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)			0	0	(17a)
Air permeability value)			0.15	0.15	(18)
Number of sides on which dwelling is sheltered			3	3	(19)
Shelter factor				0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	19.65		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	9.09	848.4	(29a)
Roof	5.62	505.8	(30)

Total area of external elements ∑A, m²		136.12	(31)
Party Wall	0	0	(32)
Party floor		2248	(32a)
Party ceiling		0	(32b)
Internal wall **		1506.6	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		36.52	(33)
Heat capacity Cm = ∑(A x k)		5108.8	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		90.9	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		6.8	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		6.8	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		43.32	(37)

Ventilation heat loss calculated monthly

11.73	11.59	11.45	10.75	10.61	9.91	9.91	9.77	10.19	10.61	10.89	11.17	(38)

Heat transfer coefficient, W/K

55.05	54.91	54.77	54.07	53.93	53.22	53.22	53.08	53.51	53.93	54.21	54.49	(39)

Heat loss parameter (HLP), W/m²K

0.98	0.98	0.97	0.96	0.96	0.95	0.95	0.94	0.95	0.96	0.96	0.97	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N	1.87	(42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

55.61	54.78	53.56	51.23	49.51	47.59	46.5	47.71	49.04	51.1	53.48	55.4	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

24.04	23.68	23.18	22.25	21.56	20.79	20.37	20.87	21.42	22.24	23.19	23.96	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

33.81	32.58	31.35	30.12	28.89	27.66	27.66	28.89	30.12	31.35	32.58	33.81	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J)	104.44	(43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

113.46	111.04	108.09	103.6	99.96	96.04	94.53	97.47	100.57	104.68	109.24	113.16	1251.84	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

179.69	158.11	166.12	141.82	134.56	118.09	114.33	120.69	124.01	142.05	155.63	177.19	1732.31	(45)

Distribution loss (46) = 0.15 x (45)

26.95	23.72	24.92	21.27	20.18	17.71	17.15	18.1	18.6	21.31	23.34	26.58	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel	0	(47)
Water storage loss (or HIU loss)		
a) If manufacturer's declared loss factor is known (kWh/day):	1.4	(48)

Temperature factor from Table 2b	0.6	(49)
Energy lost from water storage, kWh/day (48) x (49) =	0.84	(50)
b) If manufacturer's declared loss factor is not known :		
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/day	0	(54)
Enter (50) or (54) in (55)	0.84	(55)

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

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,
(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m
where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(57)

Primary circuit loss for each month from Table 3
modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26	(59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0	0	0	0	0	0	0	0	0	0	0	0	(61)

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

228.99	202.65	215.43	189.54	183.86	165.8	163.63	169.99	171.72	191.35	203.34	226.49	2312.8	(62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0	0	0	0	0	0	0	0	0	0	0	0	(63b)

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

0	0	0	0	0	0	0	0	0	0	0	0	(63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

228.99	202.65	215.43	189.54	183.86	165.8	163.63	169.99	171.72	191.35	203.34	226.49	2312.8	(64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0	0	0	0	0	0	0	0	0	0	0	0	(64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

99.19	88.2	94.68	85.33	84.18	77.44	77.46	79.57	79.4	86.67	89.92	98.36	(65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

93.62	93.62	93.62	93.62	93.62	93.62	93.62	93.62	93.62	93.62	93.62	93.62	(66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

82.35	91.18	82.35	85.1	82.35	85.1	82.35	82.35	85.1	82.35	85.1	82.35	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

163.27	164.97	160.7	151.61	140.13	129.35	122.15	120.45	124.72	133.81	145.28	156.07	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	32.36	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-74.9	-74.9	-74.9	-74.9	-74.9	-74.9	-74.9	-74.9	-74.9	-74.9	-74.9	-74.9	(71)

Water heating gains (Table 5)

133.32	131.25	127.26	118.51	113.15	107.55	104.11	106.95	110.28	116.5	124.88	132.2	(72)

Total internal gains

430.03	438.48	421.39	406.3	386.72	373.08	359.69	360.84	371.19	383.75	406.35	421.71	(73)

6. Solar gains

Solar gains in watts, calculated for each month

114.74	195.55	269.74	340.94	390.24	391.69	375.81	337.99	294.03	216.53	137.4	98.23	(83)

Total gains – internal and solar (watts)

544.77	634.03	691.13	747.24	776.97	764.78	735.51	698.83	665.22	600.28	543.76	519.94	(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, ⍰1,m (see Table 9a)

0.89	0.84	0.78	0.68	0.56	0.42	0.31	0.34	0.5	0.71	0.84	0.9	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.21	19.56	19.95	20.41	20.73	20.91	20.97	20.96	20.85	20.44	19.78	19.15	(87)

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

20.1	20.1	20.1	20.12	20.12	20.13	20.13	20.13	20.12	20.12	20.11	20.11	(88)

Roof Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.87	0.82	0.76	0.65	0.52	0.37	0.25	0.28	0.45	0.67	0.82	0.88	(89)

Roof Mean internal temperature in the rest of dwelling T2

18.49	18.82	19.2	19.63	19.91	20.07	20.11	20.11	20.02	19.67	19.04	18.44	(90)

Living area fraction 0.53 (91)

Mean internal temperature (for the whole dwelling)

18.87	19.21	19.6	20.04	20.34	20.52	20.57	20.56	20.46	20.07	19.43	18.81	(92)

Adjusted mean internal temperature:

18.87	19.21	19.6	20.04	20.34	20.52	20.57	20.56	20.46	20.07	19.43	18.81	(93)

8. Space heating requirement

Utilisation factor for gains,

0.85	0.8	0.75	0.65	0.53	0.39	0.28	0.31	0.47	0.67	0.8	0.86	(94)

Useful gains, mGm , W

464.7	509.91	515	485.79	412.55	298.54	206.36	214.66	312.03	403.46	436.86	449.36	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

801.92	785.58	717.27	602.16	466.02	314.86	211.1	220.87	340.27	510.94	668.32	796.17	(97)

Space heating requirement for each month

250.9	185.25	150.49	83.79	39.78	0	0	0	0	79.96	166.65	258.02	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

250.9	185.25	150.49	83.79	39.78	0	0	0	0	79.96	166.65	258.02	(98c)

Space heating requirement in kWh/m²/year 21.62 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0 (107)

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1275.59	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2312.8	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	35.88	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												122.56	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												122.56	(331)
Electricity for lighting (calculated in Appendix L)												138.1	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	8.6	14.63	25.66	34.17	40.89	39.65	38.89	34.39	27.06	18.53	10.15	7.08	299.69 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.08	5.4	13.76	25.45	37.97	39.84	38.73	30.09	18.64	8.58	2.97	1.55	225.05 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													3849.05

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		56.64	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		102.69	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	20.21	(349)
Electricity for lighting	0	22.77	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-62	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	232.31	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.83	(357)
SAP rating	86.6	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			5.24	(372)
Total CO2 associated with heat networks			127.25	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			127.25	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			17	(378)
Electricity for lighting			19.93	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			97.53	(383)
Total CO2, kg/year			1.74	(384)
EI rating (section 14)			98.71	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			55.27	(472)
Total CO2 associated with heat networks			1401.82	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1401.82	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			185.41	(478)
Electricity for lighting			211.82	(479)
energy saved or generated				
energy saved or generated	0		-545.2	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1253.84	(383)
Dwelling CO2 Emission Rate			22.31	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:32

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	73 m^2
Site Reference	A520	Plot Reference	A520
Address	A520, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*14.57 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.52 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*77.99 kWh_{PE}/m^2*	
Dwelling primary energy	19.97 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*39.6 kWh/m^2*	
Dwelling fabric energy efficiency	39.6 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	0.1	Flat roof (0.1)	OK
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	46.02	0.15
Exposed wall: Stair	13.5	0.15
Exposed wall: Corridor	10.8	0.15
Exposed roof: Flat roof	73.4	0.1 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	South East	N/A	1 **(!)**
2, Windows (1)	1.08	South East	0.7	1.2
3, Windows (1)	1.08	South East	0.7	1.2
4, Windows (1)	3.12	South East	0.7	1.2
5, Windows (1)	2.34	South West	0.7	1.2
6, Windows (1)	2.34	South West	0.7	1.2
7, Windows (1)	5.52	North West	0.7	1.2
8, Windows (1)	3.12	North West	0.7	1.2
9, Windows (1)	2.34	North West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.9 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A520
Dwelling Type: New Dwelling Design Stage

A520
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	73.4	(1a) x	2.6	(2a) =	190.84	(3a)
Total floor area TFA					73.4	(4)
Dwelling volume					190.84	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	2	2	(19)
Shelter factor		0.85	(20)

Infiltration rate incorporating shelter factor 0.13 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)	0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15	1.67	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

Effective air change rate from PCDB:

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	23.98		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	10.55	984.48	(29a)
Roof	7.34	660.6	(30)

Total area of external elements ∑A, m²		166.82	(31)
Party Wall	0	0	(32)
Party floor		2936	(32a)
Party ceiling		0	(32b)
Internal wall **		1117.8	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		44.03	(33)
Heat capacity Cm = ∑(A x k)		5698.88	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		77.64	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		8.35	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		8.35	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		52.38	(37)

Ventilation heat loss calculated monthly

16.22	16.02	15.82	14.82	14.61	13.61	13.61	13.41	14.01	14.61	15.02	15.42	(38)

Heat transfer coefficient, W/K

68.6	68.39	68.19	67.19	66.99	65.99	65.99	65.79	66.39	66.99	67.39	67.79	(39)

Heat loss parameter (HLP), W/m²K

0.93	0.93	0.93	0.92	0.91	0.9	0.9	0.9	0.9	0.91	0.92	0.92	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 2.33 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

63.22	62.27	60.88	58.23	56.28	54.1	52.86	54.23	55.74	58.08	60.78	62.97	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

27.31	26.9	26.33	25.28	24.49	23.62	23.14	23.71	24.33	25.26	26.34	27.22	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

38.45	37.05	35.65	34.25	32.86	31.46	31.46	32.86	34.25	35.65	37.05	38.45	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 118.72 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

128.97	126.22	122.86	117.76	113.62	109.17	107.46	110.8	114.32	118.99	124.17	128.64	1422.99	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

204.26	179.73	188.84	161.21	152.96	134.24	129.96	137.19	140.97	161.47	176.91	201.41	1969.15	(45)

Distribution loss (46) = 0.15 x (45)

30.64	26.96	28.33	24.18	22.94	20.14	19.49	20.58	21.15	24.22	26.54	30.21	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

253.56 224.26 238.14 208.92 202.26 181.95 179.26 186.49 188.68 210.78 224.62 250.72 2549.65 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

253.56 224.26 238.14 208.92 202.26 181.95 179.26 186.49 188.68 210.78 224.62 250.72 2549.65 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

107.36 95.39 102.23 91.77 90.3 82.8 82.65 85.06 85.04 93.13 96.99 106.41 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 116.29 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

103.45	114.53	103.45	106.9	103.45	106.9	103.45	103.45	106.9	103.45	106.9	103.45	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

205.1	207.23	201.86	190.45	176.03	162.49	153.44	151.31	156.67	168.09	182.5	196.05	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	34.63	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	-93.03	(71)

Water heating gains (Table 5)

144.3	141.94	137.41	127.46	121.37	115.01	111.09	114.33	118.11	125.18	134.71	143.03	(72)

Total internal gains

510.73	521.59	500.61	482.69	458.74	442.28	425.87	426.97	439.57	454.6	482	500.41	(73)

6. Solar gains

Solar gains in watts, calculated for each month

107.04	191.31	285.62	393.9	477.7	490.3	466.02	401.05	322.73	217.88	129.85	90.55	(83)

Total gains – internal and solar (watts)

617.77	712.9	786.23	876.59	936.44	932.58	891.89	828.02	762.3	672.48	611.84	590.96	(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, ⍰1,m (see Table 9a)

0.89	0.85	0.79	0.69	0.56	0.42	0.31	0.35	0.52	0.73	0.85	0.9	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

18.91	19.26	19.72	20.27	20.66	20.89	20.96	20.95	20.79	20.28	19.53	18.86	(87)

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

20.14	20.14	20.14	20.15	20.16	20.17	20.17	20.17	20.16	20.16	20.15	20.15	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.88	0.84	0.78	0.66	0.53	0.37	0.26	0.29	0.48	0.7	0.83	0.89	(89)

Roof

Mean internal temperature in the rest of dwelling T2

18.23	18.57	19.01	19.54	19.9	20.1	20.15	20.14	20.02	19.56	18.85	18.19	(90)

Living area fraction 0.37 (91)

Mean internal temperature (for the whole dwelling)

18.48	18.83	19.27	19.81	20.18	20.39	20.45	20.44	20.31	19.83	19.1	18.44	(92)

Adjusted mean internal temperature:

18.48	18.83	19.27	19.81	20.18	20.39	20.45	20.44	20.31	19.83	19.1	18.44	(93)

8. Space heating requirement

Utilisation factor for gains,

0.86	0.81	0.75	0.65	0.53	0.38	0.28	0.31	0.48	0.69	0.81	0.87	(94)

Useful gains, mGm , W

528.73	579.18	592.72	572.43	493.94	358.85	246.96	256.3	368.74	463.52	496.3	511.74	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

972.93	952.61	871.12	733.03	568	381.93	253.97	265.82	411.94	618.02	808.59	965.09	(97)

Space heating requirement for each month

330.49	250.94	207.13	115.64	55.1	0	0	0	0	114.95	224.85	337.29	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

330.49	250.94	207.13	115.64	55.1	0	0	0	0	114.95	224.85	337.29	(98c)

Space heating requirement in kWh/m²/year 22.29 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1718.2	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2549.65	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	42.68	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												157.16	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												157.16	(331)
Electricity for lighting (calculated in Appendix L)												173.47	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	11.16	18.93	33.12	43.95	52.44	50.78	49.81	44.12	34.82	23.93	13.15	9.19	385.41 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.77	7.2	18.3	33.81	50.41	52.9	51.43	39.98	24.8	11.42	3.96	2.06	299.04 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													4598.48

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		76.29	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		113.2	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	25.92	(349)
Electricity for lighting	0	28.61	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-80.27	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	255.74	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.78	(357)
SAP rating	87.4	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			6.26	(372)
Total CO2 associated with heat networks			151.37	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			151.37	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			21.8	(378)
Electricity for lighting			25.04	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			111.31	(383)
Total CO2, kg/year			1.52	(384)
EI rating (section 14)			98.74	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			65.84	(472)
Total CO2 associated with heat networks			1667.35	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1667.35	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			237.75	(478)
Electricity for lighting			266.08	(479)
energy saved or generated				
energy saved or generated	0		-705.52	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1465.66	(383)
Dwelling CO2 Emission Rate			19.97	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:34

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	59 m^2
Site Reference	A521	Plot Reference	A521
Address	A521, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*16.59 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.73 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*89.14 kWh_{PE}/m^2*	
Dwelling primary energy	22.3 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*42.8 kWh/m^2*	
Dwelling fabric energy efficiency	40 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	0.1	Flat roof (0.1)	OK
Windows, doors, and roof windows	*1.6*	1.17	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	40.11	0.15
Exposed wall: Stair	18.09	0.15
Exposed wall: Lift	8.64	0.15
Exposed wall: Corridor	8.64	0.15
Exposed roof: Flat roof	58.8	0.1 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	East	N/A	1 **(!)**
2, Windows (1)	3.12	North	0.7	1.2
3, Windows (1)	3.12	North	0.7	1.2
4, Windows (1)	2.34	North	0.7	1.2
5, Windows (1)	2.34	North West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.72 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: A521
Dwelling Type: New Dwelling Design Stage

A521
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	58.8	(1a) x	2.6	(2a) =	152.88	(3a)
Total floor area TFA					58.8	(4)
Dwelling volume					152.88	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)
			Air changes per hour		
Number of storeys in the dwelling (ns)			0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc			0	0	(9)
Additional infiltration			0	0	(10)
Structural infiltration			0	0	(11)
Suspended wooden ground floor			0	0	(12)
No draught lobby			0	0	(13)
Percentage of windows and doors draught proofed			0	0	(14)
Window infiltration			0	0	(15)
Infiltration rate			0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)			3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)			0	0	(17a)
Air permeability value)			0.15	0.15	(18)
Number of sides on which dwelling is sheltered			2	2	(19)
Shelter factor				0.85	(20)

Infiltration rate incorporating shelter factor 0.13 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.16	0.16	0.16	0.14	0.14	0.12	0.12	0.12	0.13	0.14	0.14	0.15	1.67	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

Effective air change rate from PCDB:

0.26	0.25	0.25	0.24	0.23	0.22	0.22	0.21	0.22	0.23	0.24	0.24	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	12.5		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	11.32	1056.72	(29a)
Roof	5.88	529.2	(30)

Total area of external elements ∑A, m²		147.36	(31)
Party Wall	0	0	(32)
Party floor		2352	(32a)
Party ceiling		0	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		31.87	(33)
Heat capacity Cm = ∑(A x k)		4666.92	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		79.37	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		7.35	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		7.35	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		39.22	(37)

Ventilation heat loss calculated monthly

12.99	12.83	12.67	11.87	11.71	10.9	10.9	10.74	11.23	11.71	12.03	12.35	(38)

Heat transfer coefficient, W/K

52.21	52.05	51.89	51.08	50.92	50.12	50.12	49.96	50.44	50.92	51.25	51.57	(39)

Heat loss parameter (HLP), W/m²K

0.89	0.89	0.88	0.87	0.87	0.85	0.85	0.85	0.86	0.87	0.87	0.88	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N	1.95	(42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

56.87	56.02	54.77	52.39	50.63	48.67	47.56	48.79	50.15	52.25	54.69	56.65	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

24.58	24.22	23.7	22.75	22.04	21.26	20.83	21.34	21.9	22.74	23.71	24.5	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

34.57	33.32	32.06	30.8	29.55	28.29	28.29	29.55	30.8	32.06	33.32	34.57	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J)	106.81	(43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

116.03	113.55	110.53	105.95	102.22	98.22	96.68	99.68	102.85	107.05	111.71	115.73	1280.18	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

183.76	161.69	169.89	145.03	137.61	120.77	116.92	123.42	126.82	145.27	159.15	181.2	1771.54	(45)

Distribution loss (46) = 0.15 x (45)

27.56	24.25	25.48	21.76	20.64	18.12	17.54	18.51	19.02	21.79	23.87	27.18	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel	0	(47)
Water storage loss (or HIU loss)		
a) If manufacturer's declared loss factor is known (kWh/day):	1.4	(48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

233.06 206.23 219.19 192.75 186.91 168.48 166.22 172.73 174.53 194.57 206.86 230.5 2352.03 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

233.06 206.23 219.19 192.75 186.91 168.48 166.22 172.73 174.53 194.57 206.86 230.5 2352.03 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

100.54 89.39 95.93 86.39 85.2 78.32 78.32 80.48 80.34 87.74 91.09 99.69 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 97.38 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

87.11	96.45	87.11	90.02	87.11	90.02	87.11	87.11	90.02	87.11	90.02	87.11	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

169.91	171.67	167.23	157.77	145.83	134.61	127.11	125.35	129.79	139.25	151.19	162.41	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	32.74	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	-77.9	(71)

Water heating gains (Table 5)

135.14	133.02	128.94	119.99	114.51	108.78	105.27	108.17	111.58	117.94	126.51	133.99	(72)

Total internal gains

444.37	453.35	435.49	419.99	399.67	385.62	371.71	372.85	383.6	396.51	419.93	435.73	(73)

6. Solar gains

Solar gains in watts, calculated for each month

25.68	49.79	85.81	138.6	186.6	199.56	186.4	148.07	103.51	59.64	31.82	21.31	(83)

Total gains – internal and solar (watts)

470.05	503.14	521.31	558.59	586.27	585.18	558.11	520.91	487.12	456.16	451.75	457.04	(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, ⍰1,m (see Table 9a)

0.9	0.88	0.84	0.76	0.65	0.49	0.38	0.41	0.6	0.78	0.87	0.91	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.02	19.25	19.62	20.15	20.58	20.86	20.95	20.94	20.75	20.23	19.57	18.99	(87)

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

20.18	20.18	20.18	20.19	20.2	20.21	20.21	20.21	20.2	20.2	20.19	20.19	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.89	0.87	0.83	0.74	0.61	0.44	0.31	0.35	0.55	0.75	0.85	0.9	(89)

Roof

Mean internal temperature in the rest of dwelling T2

18.36	18.59	18.95	19.47	19.87	20.11	20.18	20.17	20.02	19.55	18.92	18.35	(90)

Living area fraction 0.45 (91)

Mean internal temperature (for the whole dwelling)

18.66	18.89	19.25	19.78	20.19	20.45	20.53	20.52	20.35	19.86	19.22	18.64	(92)

Adjusted mean internal temperature:

18.66	18.89	19.25	19.78	20.19	20.45	20.53	20.52	20.35	19.86	19.22	18.64	(93)

8. Space heating requirement

Utilisation factor for gains,

0.87	0.84	0.81	0.73	0.61	0.46	0.34	0.38	0.56	0.74	0.83	0.87	(94)

Useful gains, mGm , W

408.04	424.7	420.78	406.19	358.45	269.11	189.34	195.59	272.71	338.2	375.9	399.68	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

749.73	728.07	661.64	555.59	432.33	293.21	196.97	205.77	315.39	471.41	620.92	744.53	(97)

Space heating requirement for each month

254.22	203.86	179.2	107.57	54.97	0	0	0	0	99.11	176.41	256.56	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

254.22	203.86	179.2	107.57	54.97	0	0	0	0	99.11	176.41	256.56	(98c)

Space heating requirement in kWh/m²/year 22.65 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1398.5	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2352.03	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	37.51	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside													125.9	(330a)
warm air heating system fans													0	(330b)
pump for solar water heating													0	(330g)
pump for storage WWHRS (see section G3.3)													0	(330h)
electricity use by heat interface unit													0	(330i)
Total electricity for pumps and fans													125.9	(331)
Electricity for lighting (calculated in Appendix L)													146.08	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling														
PV	8.97	15.25	26.75	35.6	42.59	41.29	40.5	35.83	28.2	19.32	10.58	7.38	312.27	(333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0	(334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0	(335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported														
PV	2.17	5.65	14.39	26.61	39.69	41.66	40.49	31.46	19.49	8.97	3.1	1.62	235.29	(333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0	(334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0	(335b)
Appendix Q items: annual energy													0	
energy saved													0	(336b)
energy used													0	(337b)
Total delivered energy for all uses													4022.51	

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		62.09	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		104.43	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	20.76	(349)
Electricity for lighting	0	24.09	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-64.65	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	238.73	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.83	(357)
SAP rating	86.58	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Where the heat network is listed in the PCDB:				
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			5.48	(372)
Total CO2 associated with heat networks			132.99	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			132.99	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			17.46	(378)
Electricity for lighting			21.08	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			102	(383)
Total CO2, kg/year			1.73	(384)
EI rating (section 14)			98.68	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			57.77	(472)
Total CO2 associated with heat networks			1465.15	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1465.15	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			190.46	(478)
Electricity for lighting			224.06	(479)
energy saved or generated				
energy saved or generated	0		-568.44	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1311.23	(383)
Dwelling CO2 Emission Rate			22.3	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:35

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	71 m^2
Site Reference	B11	Plot Reference	B11
Address	B11, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*13.34 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.34 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*70.66 kWh_{PE}/m^2*	
Dwelling primary energy	18.02 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*35.5 kWh/m^2*	
Dwelling fabric energy efficiency	34.4 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	0	PW (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	0.1	Ground floor (0.1)	OK
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	49.23	0.15
Exposed wall: Corridor	1.89	0.15
Party wall: PW	19.71	0 **(!)**
Ground floor: Ground floor	71.3	0.1 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North	N/A	1 **(!)**
2, Windows (1)	2.34	North West	0.7	1.2
3, Windows (1)	2.34	North West	0.7	1.2
4, Windows (1)	5.52	South	0.7	1.2
5, Windows (1)	3.12	South	0.7	1.2
6, Windows (1)	2.34	South West	0.7	1.2
7, Windows (1)	2.34	South West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.88 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: B11
Dwelling Type: New Dwelling Design Stage

B11
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	71.3	(1a) x	2.6	(2a) =	185.38	(3a)
Total floor area TFA					71.3	(4)
Dwelling volume					185.38	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	3	3	(19)
Shelter factor		0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	20.61		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	7.13	1426	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	7.67	715.68	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		142.58	(31)
Party Wall	0	394.2	(32)
Party floor		0	(32a)
Party ceiling		2139	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		37.57	(33)
Heat capacity Cm = ∑(A x k)		5403.88	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		75.79	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		7.15	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		7.15	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		44.72	(37)

Ventilation heat loss calculated monthly

14.88	14.7	14.52	13.63	13.46	12.57	12.57	12.39	12.92	13.46	13.81	14.17	(38)

Heat transfer coefficient, W/K

59.6	59.42	59.24	58.35	58.18	57.29	57.29	57.11	57.64	58.18	58.53	58.89	(39)

Heat loss parameter (HLP), W/m²K

0.84	0.83	0.83	0.82	0.82	0.8	0.8	0.8	0.81	0.82	0.82	0.83	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N	2.28	(42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

62.4	61.46	60.1	57.48	55.55	53.4	52.18	53.53	55.02	57.33	60	62.16	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

26.96	26.56	25.99	24.95	24.18	23.31	22.85	23.41	24.02	24.94	26	26.87	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

37.95	36.57	35.19	33.81	32.43	31.05	31.05	32.43	33.81	35.19	36.57	37.95	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J)	117.19	(43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

127.31	124.59	121.28	116.25	112.16	107.77	106.08	109.37	112.85	117.46	122.57	126.98	1404.68	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

201.63	177.42	186.41	159.14	150.99	132.51	128.29	135.43	139.15	159.4	174.63	198.82	1943.82	(45)

Distribution loss (46) = 0.15 x (45)

30.24	26.61	27.96	23.87	22.65	19.88	19.24	20.31	20.87	23.91	26.19	29.82	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel	0	(47)
Water storage loss (or HIU loss)		
a) If manufacturer's declared loss factor is known (kWh/day):	1.4	(48)

Temperature factor from Table 2b	0.6	(49)
Energy lost from water storage, kWh/day (48) x (49) =	0.84	(50)
b) If manufacturer's declared loss factor is not known :		
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/day	0	(54)
Enter (50) or (54) in (55)	0.84	(55)

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

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,
(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m
where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(57)

Primary circuit loss for each month from Table 3
modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26	(59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0	0	0	0	0	0	0	0	0	0	0	0	(61)

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

250.93	221.95	235.71	206.85	200.29	180.22	177.59	184.73	186.87	208.7	222.34	248.12	2524.31	(62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0	0	0	0	0	0	0	0	0	0	0	0	(63b)

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

0	0	0	0	0	0	0	0	0	0	0	0	(63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

250.93	221.95	235.71	206.85	200.29	180.22	177.59	184.73	186.87	208.7	222.34	248.12	2524.31	(64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0	0	0	0	0	0	0	0	0	0	0	0	(64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

106.48	94.62	101.42	91.08	89.65	82.23	82.1	84.47	84.44	92.44	96.23	105.55	(65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

113.86	113.86	113.86	113.86	113.86	113.86	113.86	113.86	113.86	113.86	113.86	113.86	(66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

101.03	111.86	101.03	104.4	101.03	104.4	101.03	101.03	104.4	101.03	104.4	101.03	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

200.31	202.39	197.15	186	171.93	158.7	149.86	147.78	153.02	164.17	178.24	191.47	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

34.39	34.39	34.39	34.39	34.39	34.39	34.39	34.39	34.39	34.39	34.39	34.39	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	(71)

Water heating gains (Table 5)

143.12	140.8	136.32	126.5	120.49	114.21	110.35	113.54	117.28	124.25	133.66	141.87	(72)

Total internal gains

501.63	512.21	491.67	474.07	450.61	434.46	418.4	419.51	431.85	446.61	473.46	491.54	(73)

6. Solar gains

Solar gains in watts, calculated for each month

137.29	231.9	313.84	385.88	431.56	428.7	413.16	378.68	338.53	255.2	164.05	117.78	(83)

Total gains – internal and solar (watts)

638.92	744.11	805.5	859.95	882.17	863.16	831.56	798.19	770.39	701.81	637.51	609.31	(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, ⍰1,m (see Table 9a)

0.86	0.81	0.75	0.66	0.54	0.4	0.3	0.32	0.47	0.67	0.81	0.88	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.3	19.65	20.03	20.45	20.74	20.92	20.97	20.97	20.87	20.49	19.86	19.24	(87)

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

20.22	20.22	20.23	20.24	20.24	20.25	20.25	20.25	20.25	20.24	20.24	20.23	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.85	0.8	0.73	0.63	0.5	0.36	0.25	0.27	0.43	0.64	0.79	0.86	(89)

Roof

Mean internal temperature in the rest of dwelling T2

18.67	19.01	19.37	19.77	20.04	20.2	20.24	20.23	20.15	19.82	19.22	18.62	(90)

Living area fraction 0.38 (91)

Mean internal temperature (for the whole dwelling)

18.91	19.25	19.62	20.03	20.31	20.47	20.52	20.51	20.42	20.08	19.46	18.86	(92)

Adjusted mean internal temperature:

18.91	19.25	19.62	20.03	20.31	20.47	20.52	20.51	20.42	20.08	19.46	18.86	(93)

8. Space heating requirement

Utilisation factor for gains,

0.83	0.78	0.72	0.62	0.51	0.37	0.26	0.29	0.44	0.64	0.77	0.84	(94)

Useful gains, mGm , W

529.76	577.51	576.56	534.92	447.96	320.47	219.92	229.16	338.15	447.83	494.02	512.69	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

870.79	852.72	777.2	649.49	500.8	336.35	224.44	234.94	364.56	551.3	723.72	863.23	(97)

Space heating requirement for each month

253.72	184.94	149.28	82.49	39.31	0	0	0	0	76.98	165.38	260.8	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

253.72	184.94	149.28	82.49	39.31	0	0	0	0	76.98	165.38	260.8	(98c)

Space heating requirement in kWh/m²/year 17.01 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1273.56	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2524.31	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	37.98	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												152.66	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												152.66	(331)
Electricity for lighting (calculated in Appendix L)												169.43	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	10.91	18.51	32.38	42.97	51.27	49.65	48.7	43.14	34.04	23.4	12.86	8.98	376.82 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.71	7.04	17.9	33.07	49.29	51.72	50.29	39.09	24.25	11.17	3.87	2.01	292.41 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													4119.95

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		56.55	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		112.08	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	25.17	(349)
Electricity for lighting	0	27.94	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-78.48	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	235.25	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.73	(357)
SAP rating	88.2	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Where the heat network is listed in the PCDB:				
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			5.54	(372)
Total CO2 associated with heat networks			134.67	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			134.67	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			21.18	(378)
Electricity for lighting			24.45	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			95.33	(383)
Total CO2, kg/year			1.34	(384)
EI rating (section 14)			98.9	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			58.47	(472)
Total CO2 associated with heat networks			1483.62	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1483.62	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			230.94	(478)
Electricity for lighting			259.87	(479)
energy saved or generated				
energy saved or generated	0		-689.82	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1284.61	(383)
Dwelling CO2 Emission Rate			18.02	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:37

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	51 m^2
Site Reference	B12	Plot Reference	B12
Address	B12, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*15.52 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.68 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*82.71 kWh_{PE}/m^2*	
Dwelling primary energy	21.67 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*36.8 kWh/m^2*	
Dwelling fabric energy efficiency	36.5 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	0	PW (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	0.1	Ground floor (0.1)	OK
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.17	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	13.65	0.15
Exposed wall: Corridor	12.42	0.15
Exposed wall: Stair	14.04	0.15
Party wall: PW	19.71	0 **(!)**
Ground floor: Ground floor	50.9	0.1 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North West	N/A	1 **(!)**
2, Windows (1)	5.52	South East	0.7	1.2
3, Windows (1)	3.12	South East	0.7	1.2
4, Windows (1)	5.52	West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))

Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.63 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: B12
Dwelling Type: New Dwelling Design Stage

B12
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	50.9	(1a) x	2.6	(2a) =	132.34	(3a)
Total floor area TFA					50.9	(4)
Dwelling volume					132.34	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	3	3	(19)
Shelter factor		0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	16.21		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	5.09	1018	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	6.02	561.54	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		107.33	(31)
Party Wall	0	394.2	(32)
Party floor		0	(32a)
Party ceiling		1527	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		29.48	(33)
Heat capacity Cm = ∑(A x k)		4229.74	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		83.1	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		5.35	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		5.35	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		34.83	(37)

Ventilation heat loss calculated monthly

10.62	10.49	10.37	9.73	9.61	8.97	8.97	8.84	9.23	9.61	9.86	10.11	(38)

Heat transfer coefficient, W/K

45.45	45.33	45.2	44.56	44.44	43.8	43.8	43.68	44.06	44.44	44.69	44.94	(39)

Heat loss parameter (HLP), W/m²K

0.89	0.89	0.89	0.88	0.87	0.86	0.86	0.86	0.87	0.87	0.88	0.88	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N	1.72	(42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

53	52.21	51.04	48.82	47.18	45.36	44.32	45.47	46.73	48.7	50.96	52.8	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

22.92	22.58	22.1	21.21	20.55	19.82	19.42	19.9	20.41	21.2	22.1	22.84	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

32.21	31.04	29.87	28.7	27.52	26.35	26.35	27.52	28.7	29.87	31.04	32.21	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J)	99.53	(43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

108.13	105.82	103.01	98.73	95.26	91.53	90.09	92.89	95.84	99.76	104.1	107.85	1193.02 (44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

171.25	150.68	158.32	135.16	128.24	112.54	108.96	115.02	118.19	135.38	148.32	168.86	1650.91 (45)

Distribution loss (46) = 0.15 x (45)

25.69	22.6	23.75	20.27	19.24	16.88	16.34	17.25	17.73	20.31	22.25	25.33	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel	0	(47)
Water storage loss (or HIU loss)		
a) If manufacturer's declared loss factor is known (kWh/day):	1.4	(48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

220.55 195.22 207.62 182.87 177.54 160.26 158.26 164.32 165.9 184.68 196.03 218.16 2231.41 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

220.55 195.22 207.62 182.87 177.54 160.26 158.26 164.32 165.9 184.68 196.03 218.16 2231.41 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

96.38 85.73 92.08 83.11 82.08 75.59 75.67 77.69 77.47 84.45 87.48 95.59 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

75.44	83.52	75.44	77.96	75.44	77.96	75.44	75.44	77.96	75.44	77.96	75.44	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

149.57	151.12	147.21	138.89	128.37	118.5	111.9	110.34	114.26	122.58	133.09	142.97	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	(71)

Water heating gains (Table 5)

129.55	127.57	123.77	115.43	110.32	104.99	101.71	104.42	107.59	113.51	121.51	128.48	(72)

Total internal gains

403.31	410.97	395.17	381.02	362.89	350.19	337.8	338.95	348.55	360.29	381.3	395.64	(73)

6. Solar gains

Solar gains in watts, calculated for each month

93.06	164.5	237.98	311.59	360.74	362.34	347.65	310.97	263.8	185.58	112.63	78.85	(83)

Total gains – internal and solar (watts)

496.37	575.47	633.15	692.62	723.63	712.53	685.45	649.92	612.35	545.87	493.93	474.49	(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, ⍰1,m (see Table 9a)

0.86	0.81	0.74	0.64	0.51	0.38	0.28	0.3	0.46	0.67	0.81	0.87	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.36	19.7	20.09	20.51	20.79	20.93	20.98	20.97	20.88	20.52	19.9	19.31	(87)

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

20.17	20.18	20.18	20.19	20.19	20.2	20.2	20.2	20.2	20.19	20.19	20.18	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.85	0.8	0.72	0.61	0.48	0.33	0.23	0.25	0.41	0.64	0.79	0.86	(89)

Roof

Mean internal temperature in the rest of dwelling T2

18.69	19.01	19.38	19.78	20.03	20.16	20.19	20.19	20.12	19.8	19.22	18.64	(90)

Living area fraction 0.49 (91)

Mean internal temperature (for the whole dwelling)

19.02	19.35	19.72	20.14	20.4	20.54	20.57	20.57	20.49	20.15	19.55	18.97	(92)

Adjusted mean internal temperature:

19.02	19.35	19.72	20.14	20.4	20.54	20.57	20.57	20.49	20.15	19.55	18.97	(93)

8. Space heating requirement

Utilisation factor for gains,

0.83	0.78	0.71	0.61	0.49	0.35	0.25	0.27	0.43	0.64	0.78	0.84	(94)

Useful gains, mGm , W

411.65	447.18	449.99	420.21	351.26	249.83	171.2	178.34	262.91	347.43	383.09	399.14	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

668.91	654.75	597.74	500.68	386.39	259.99	174.06	182.12	281.44	424.39	556.46	663.65	(97)

Space heating requirement for each month

191.4	139.48	109.92	57.94	26.14	0	0	0	0	57.26	124.83	196.79	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

191.4	139.48	109.92	57.94	26.14	0	0	0	0	57.26	124.83	196.79	(98c)

Space heating requirement in kWh/m²/year 17.76 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	948.96	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2231.41	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	31.8	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												108.98	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												108.98	(331)
Electricity for lighting (calculated in Appendix L)												126.51	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	7.86	13.37	23.47	31.26	37.42	36.3	35.61	31.48	24.76	16.94	9.27	6.47	274.21 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	1.89	4.92	12.53	23.17	34.57	36.28	35.26	27.39	16.97	7.81	2.7	1.41	204.9 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													3415.85

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		42.13	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		99.07	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	17.97	(349)
Electricity for lighting	0	20.86	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-56.67	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	215.37	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.81	(357)
SAP rating	86.89	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			4.62	(372)
Total CO2 associated with heat networks			112.75	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			112.75	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			15.12	(378)
Electricity for lighting			18.26	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			85.28	(383)
Total CO2, kg/year			1.68	(384)
EI rating (section 14)			98.81	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			48.9	(472)
Total CO2 associated with heat networks			1242.33	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1242.33	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			164.87	(478)
Electricity for lighting			194.04	(479)
energy saved or generated				
energy saved or generated	0		-498.38	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1102.85	(383)
Dwelling CO2 Emission Rate			21.67	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:38

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	87 m^2
Site Reference	B13	Plot Reference	B13
Address	B13, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*13.36 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.31 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*70.65 kWh_{PE}/m^2*	
Dwelling primary energy	17.84 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*40.1 kWh/m^2*	
Dwelling fabric energy efficiency	37.3 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	0.1	Ground floor (0.1)	OK
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	54.81	0.15
Exposed wall: Corridor	4.59	0.15
Exposed wall: Stair	14.04	0.15
Exposed wall: Lift	7.56	0.15
Ground floor: Ground floor	86.6	0.1 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North West	N/A	1 **(!)**
2, Windows (1)	1.08	North West	0.7	1.2
3, Windows (1)	2.34	North West	0.7	1.2
4, Windows (1)	1.08	North	0.7	1.2
5, Windows (1)	3.12	North	0.7	1.2
6, Windows (1)	5.52	North	0.7	1.2
7, Windows (1)	2.34	East	0.7	1.2
8, Windows (1)	2.34	East	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.55 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	1.07 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: B13
Dwelling Type: New Dwelling Design Stage

B13
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	86.6	(1a) x	2.6	(2a) =	225.16	(3a)
Total floor area TFA					86.6	(4)
Dwelling volume					225.16	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	3	3	(19)
Shelter factor		0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	20.4		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	8.66	1732	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	12.15	1134	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		187.58	(31)
Party Wall	0	0	(32)
Party floor		0	(32a)
Party ceiling		2598	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		43.37	(33)
Heat capacity Cm = ∑(A x k)		6193	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		71.51	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		9.4	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		9.4	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		52.77	(37)

Ventilation heat loss calculated monthly

18.07	17.86	17.64	16.56	16.34	15.26	15.26	15.05	15.7	16.34	16.78	17.21	(38)

Heat transfer coefficient, W/K

70.85	70.63	70.41	69.33	69.12	68.04	68.04	67.82	68.47	69.12	69.55	69.98	(39)

Heat loss parameter (HLP), W/m²K

0.82	0.82	0.81	0.8	0.8	0.79	0.79	0.78	0.79	0.8	0.8	0.81	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N		2.58	(42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

67.42	66.4	64.93	62.1	60.02	57.69	56.37	57.84	59.44	61.94	64.82	67.16	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

29.11	28.68	28.07	26.95	26.11	25.18	24.67	25.28	25.94	26.93	28.08	29.02	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

41.01	39.52	38.03	36.54	35.05	33.56	33.56	35.05	36.54	38.03	39.52	41.01	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J)	126.61	(43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

137.54	134.61	131.03	125.59	121.17	116.43	114.6	118.16	121.92	126.9	132.43	137.19	1517.56	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

217.83	191.68	201.39	171.93	163.12	143.16	138.6	146.31	150.34	172.21	188.66	214.8	2100.02	(45)

Distribution loss (46) = 0.15 x (45)

32.68	28.75	30.21	25.79	24.47	21.47	20.79	21.95	22.55	25.83	28.3	32.22	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel	0	(47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day):	1.4	(48)

Temperature factor from Table 2b	0.6	(49)
Energy lost from water storage, kWh/day (48) x (49) =	0.84	(50)
b) If manufacturer's declared loss factor is not known :		
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/day	0	(54)
Enter (50) or (54) in (55)	0.84	(55)

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

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,
(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m
where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(57)

Primary circuit loss for each month from Table 3
modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26	(59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0	0	0	0	0	0	0	0	0	0	0	0	(61)

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

267.14	236.21	250.69	219.64	212.43	190.87	187.9	195.61	198.05	221.51	236.38	264.1	2680.52	(62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0	0	0	0	0	0	0	0	0	0	0	0	(63b)

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

0	0	0	0	0	0	0	0	0	0	0	0	(63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

267.14	236.21	250.69	219.64	212.43	190.87	187.9	195.61	198.05	221.51	236.38	264.1	2680.52	(64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0	0	0	0	0	0	0	0	0	0	0	0	(64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

111.87	99.36	106.4	95.34	93.68	85.77	85.53	88.09	88.16	96.7	100.9	110.86	(65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

128.81	128.81	128.81	128.81	128.81	128.81	128.81	128.81	128.81	128.81	128.81	128.81	(66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

117.87	130.5	117.87	121.8	117.87	121.8	117.87	117.87	121.8	117.87	121.8	117.87	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

232.68	235.1	229.01	216.06	199.71	184.34	174.07	171.66	177.74	190.7	207.05	222.42	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

35.88	35.88	35.88	35.88	35.88	35.88	35.88	35.88	35.88	35.88	35.88	35.88	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	(71)

Water heating gains (Table 5)

150.37	147.85	143.01	132.41	125.91	119.12	114.95	118.4	122.44	129.97	140.14	149.01	(72)

Total internal gains

562.56	575.09	551.54	531.91	505.14	486.91	468.54	469.57	483.63	500.18	530.63	550.94	(73)

6. Solar gains

Solar gains in watts, calculated for each month

51.05	99.52	168.8	262.69	342.27	360.69	339.07	276.65	200.91	118.85	63.45	42.19	(83)

Total gains – internal and solar (watts)

613.61	674.61	720.34	794.61	847.4	847.6	807.61	746.23	684.54	619.04	594.08	593.13	(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, ⍰1,m (see Table 9a)

0.9	0.88	0.84	0.75	0.62	0.47	0.35	0.39	0.58	0.78	0.87	0.91	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

18.93	19.2	19.61	20.18	20.61	20.87	20.95	20.94	20.76	20.21	19.51	18.89	(87)

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

20.24	20.24	20.24	20.25	20.25	20.27	20.27	20.27	20.26	20.25	20.25	20.25	(88)

Roof Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.9	0.87	0.82	0.72	0.59	0.42	0.3	0.34	0.54	0.75	0.86	0.9	(89)

Roof Mean internal temperature in the rest of dwelling T2

18.33	18.59	19	19.54	19.94	20.18	20.24	20.23	20.08	19.59	18.91	18.3	(90)

Living area fraction 0.33 (91)

Mean internal temperature (for the whole dwelling)

18.53	18.8	19.2	19.76	20.17	20.41	20.48	20.47	20.31	19.79	19.11	18.5	(92)

Adjusted mean internal temperature:

18.53	18.8	19.2	19.76	20.17	20.41	20.48	20.47	20.31	19.79	19.11	18.5	(93)

8. Space heating requirement

Utilisation factor for gains,

0.87	0.84	0.8	0.71	0.58	0.43	0.32	0.35	0.54	0.74	0.84	0.88	(94)

Useful gains, mGm , W

535.15	568.46	574.49	561.31	493.97	366.24	254.97	263.68	370.55	455.72	496.3	521.7	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

1007.95	981.48	894.52	752.76	585.11	395.14	263.93	275.95	425.04	635.48	835.15	1000.55	(97)

Space heating requirement for each month

351.76	277.55	238.1	137.84	67.81	0	0	0	0	133.74	243.98	356.27	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

351.76	277.55	238.1	137.84	67.81	0	0	0	0	133.74	243.98	356.27	(98c)

Space heating requirement in kWh/m²/year 20.87 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1897.4	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2680.52	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	45.78	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												188.85	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												188.85	(331)
Electricity for lighting (calculated in Appendix L)												197.66	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	13.19	22.32	38.94	51.49	61.27	59.27	58.14	51.59	40.82	28.17	15.53	10.87	451.6 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	3.37	8.74	22.2	40.96	61	63.99	62.23	48.4	30.05	13.86	4.81	2.51	362.12 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													4964.43

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		84.24	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		119.02	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	31.14	(349)
Electricity for lighting	0	32.59	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-94.71	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	264.28	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.72	(357)
SAP rating	88.28	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			6.72	(372)
Total CO2 associated with heat networks			162.37	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			162.37	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			26.2	(378)
Electricity for lighting			28.53	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			113.81	(383)
Total CO2, kg/year			1.31	(384)
EI rating (section 14)			98.84	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			70.63	(472)
Total CO2 associated with heat networks			1788.5	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1788.5	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			285.7	(478)
Electricity for lighting			303.17	(479)
energy saved or generated				
energy saved or generated	0		-832.04	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1545.33	(383)
Dwelling CO2 Emission Rate			17.84	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:40

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	71 m^2
Site Reference	B24	Plot Reference	B24
Address	B24, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*11.54 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.05 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*61 kWh_{PE}/m^2*	
Dwelling primary energy	14.91 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*27.1 kWh/m^2*	
Dwelling fabric energy efficiency	27.2 kWh/m^2	FAIL

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	0	PW (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	49.23	0.15
Exposed wall: Corridor	1.89	0.15
Party wall: PW	19.71	0 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North	N/A	1 **(!)**
2, Windows (1)	2.34	North West	0.7	1.2
3, Windows (1)	2.34	North West	0.7	1.2
4, Windows (1)	5.52	South	0.7	1.2
5, Windows (1)	3.12	South	0.7	1.2
6, Windows (1)	2.34	South West	0.7	1.2
7, Windows (1)	2.34	South West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.88 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: B24
Dwelling Type: New Dwelling Design Stage

B24
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	71.3	(1a) x	2.6	(2a) =	185.38	(3a)
Total floor area TFA					71.3	(4)
Dwelling volume					185.38	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	3	3	(19)
Shelter factor		0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	20.61		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	7.67	715.68	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		71.28	(31)
Party Wall	0	394.2	(32)
Party floor		2852	(32a)
Party ceiling		2139	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		30.44	(33)
Heat capacity Cm = ∑(A x k)		6829.88	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		95.79	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		3.55	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		3.55	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		33.99	(37)

Ventilation heat loss calculated monthly

14.88	14.7	14.52	13.63	13.46	12.57	12.57	12.39	12.92	13.46	13.81	14.17	(38)

Heat transfer coefficient, W/K

48.87	48.69	48.51	47.62	47.45	46.56	46.56	46.38	46.91	47.45	47.8	48.16	(39)

Heat loss parameter (HLP), W/m²K

0.69	0.68	0.68	0.67	0.67	0.65	0.65	0.65	0.66	0.67	0.67	0.68	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 2.28 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

62.4	61.46	60.1	57.48	55.55	53.4	52.18	53.53	55.02	57.33	60	62.16	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

26.96	26.56	25.99	24.95	24.18	23.31	22.85	23.41	24.02	24.94	26	26.87	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

37.95	36.57	35.19	33.81	32.43	31.05	31.05	32.43	33.81	35.19	36.57	37.95	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 117.19 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

127.31	124.59	121.28	116.25	112.16	107.77	106.08	109.37	112.85	117.46	122.57	126.98	1404.68	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

201.63	177.42	186.41	159.14	150.99	132.51	128.29	135.43	139.15	159.4	174.63	198.82	1943.82	(45)

Distribution loss (46) = 0.15 x (45)

30.24	26.61	27.96	23.87	22.65	19.88	19.24	20.31	20.87	23.91	26.19	29.82	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b	0.6	(49)
Energy lost from water storage, kWh/day (48) x (49) =	0.84	(50)
b) If manufacturer's declared loss factor is not known :		
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/day	0	(54)
Enter (50) or (54) in (55)	0.84	(55)

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

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,
(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m
where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(57)

Primary circuit loss for each month from Table 3
modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26	(59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0	0	0	0	0	0	0	0	0	0	0	0	(61)

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

250.93	221.95	235.71	206.85	200.29	180.22	177.59	184.73	186.87	208.7	222.34	248.12	2524.31	(62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0	0	0	0	0	0	0	0	0	0	0	0	(63b)

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

0	0	0	0	0	0	0	0	0	0	0	0	(63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

250.93	221.95	235.71	206.85	200.29	180.22	177.59	184.73	186.87	208.7	222.34	248.12	2524.31	(64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0	0	0	0	0	0	0	0	0	0	0	0	(64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

106.48	94.62	101.42	91.08	89.65	82.23	82.1	84.47	84.44	92.44	96.23	105.55	(65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

113.86	113.86	113.86	113.86	113.86	113.86	113.86	113.86	113.86	113.86	113.86	113.86	(66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

101.03	111.86	101.03	104.4	101.03	104.4	101.03	101.03	104.4	101.03	104.4	101.03	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

200.31	202.39	197.15	186	171.93	158.7	149.86	147.78	153.02	164.17	178.24	191.47	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

34.39	34.39	34.39	34.39	34.39	34.39	34.39	34.39	34.39	34.39	34.39	34.39	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	(71)

Water heating gains (Table 5)

143.12	140.8	136.32	126.5	120.49	114.21	110.35	113.54	117.28	124.25	133.66	141.87	(72)

Total internal gains

501.63	512.21	491.67	474.07	450.61	434.46	418.4	419.51	431.85	446.61	473.46	491.54	(73)

6. Solar gains

Solar gains in watts, calculated for each month

137.29	231.9	313.84	385.88	431.56	428.7	413.16	378.68	338.53	255.2	164.05	117.78	(83)

Total gains – internal and solar (watts)

638.92	744.11	805.5	859.95	882.17	863.16	831.56	798.19	770.39	701.81	637.51	609.31	(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, ⍰1,m (see Table 9a)

0.87	0.8	0.73	0.61	0.48	0.34	0.25	0.27	0.41	0.63	0.8	0.88	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

20.08	20.34	20.59	20.82	20.94	20.99	21	21	20.97	20.82	20.46	20.04	(87)

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

20.35	20.36	20.36	20.37	20.37	20.38	20.38	20.38	20.38	20.37	20.37	20.36	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.85	0.79	0.71	0.59	0.45	0.31	0.21	0.23	0.38	0.6	0.78	0.87	(89)

Roof

Mean internal temperature in the rest of dwelling T2

19.51	19.77	20	20.22	20.32	20.37	20.38	20.38	20.36	20.23	19.89	19.48	(90)

Living area fraction 0.38 (91)

Mean internal temperature (for the whole dwelling)

19.73	19.99	20.22	20.45	20.56	20.61	20.62	20.62	20.59	20.46	20.1	19.69	(92)

Adjusted mean internal temperature:

19.73	19.99	20.22	20.45	20.56	20.61	20.62	20.62	20.59	20.46	20.1	19.69	(93)

8. Space heating requirement

Utilisation factor for gains,

0.84	0.78	0.7	0.59	0.46	0.32	0.22	0.24	0.39	0.61	0.77	0.86	(94)

Useful gains, mGm , W

537.8	578.5	566.29	505.66	405.22	276.81	186.4	194.78	298.57	426.14	493.92	521.19	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

754	734.6	665.66	549.81	420.2	279.69	186.97	195.56	304.61	467.6	621.65	746.1	(97)

Space heating requirement for each month

160.86	104.9	73.93	31.79	11.15	0	0	0	0	30.84	91.96	167.33	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

160.86	104.9	73.93	31.79	11.15	0	0	0	0	30.84	91.96	167.33	(98c)

Space heating requirement in kWh/m²/year 9.44 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	706.4	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2524.31	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	32.31	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												152.66	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												152.66	(331)
Electricity for lighting (calculated in Appendix L)												169.43	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	10.91	18.51	32.38	42.97	51.27	49.65	48.7	43.14	34.04	23.4	12.86	8.98	376.82 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.71	7.04	17.9	33.07	49.29	51.72	50.29	39.09	24.25	11.17	3.87	2.01	292.41 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													3552.79

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		31.36	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		112.08	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	25.17	(349)
Electricity for lighting	0	27.94	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-78.48	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	210.07	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.65	(357)
SAP rating	89.46	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			4.67	(372)
Total CO2 associated with heat networks			114.51	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			114.51	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			21.18	(378)
Electricity for lighting			24.45	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			75.17	(383)
Total CO2, kg/year			1.05	(384)
EI rating (section 14)			99.13	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			49.57	(472)
Total CO2 associated with heat networks			1261.89	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1261.89	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			230.94	(478)
Electricity for lighting			259.87	(479)
energy saved or generated				
energy saved or generated	0		-689.82	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1062.89	(383)
Dwelling CO2 Emission Rate			14.91	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:41

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	51 m^2
Site Reference	B25	Plot Reference	B25
Address	B25, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*13.66 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.39 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*72.71 kWh_{PE}/m^2*	
Dwelling primary energy	18.57 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*28.3 kWh/m^2*	
Dwelling fabric energy efficiency	29.3 kWh/m^2	FAIL

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	0	PW (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.17	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	13.65	0.15
Exposed wall: Corridor	12.42	0.15
Exposed wall: Stair	14.04	0.15
Party wall: PW	19.71	0 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North West	N/A	1 **(!)**
2, Windows (1)	5.52	South East	0.7	1.2
3, Windows (1)	3.12	South East	0.7	1.2
4, Windows (1)	5.52	West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.63 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: B25
Dwelling Type: New Dwelling Design Stage

B25
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	50.9	(1a) x	2.6	(2a) =	132.34	(3a)
Total floor area TFA					50.9	(4)
Dwelling volume					132.34	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	3	3	(19)
Shelter factor		0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	16.21		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	6.02	561.54	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		56.43	(31)
Party Wall	0	394.2	(32)
Party floor		2036	(32a)
Party ceiling		1527	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		24.39	(33)
Heat capacity Cm = ∑(A x k)		5247.74	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		103.1	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		2.8	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		2.8	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		27.19	(37)

Ventilation heat loss calculated monthly

10.62	10.49	10.37	9.73	9.61	8.97	8.97	8.84	9.23	9.61	9.86	10.11	(38)

Heat transfer coefficient, W/K

37.81	37.69	37.56	36.92	36.8	36.16	36.16	36.04	36.42	36.8	37.05	37.3	(39)

Heat loss parameter (HLP), W/m²K

0.74	0.74	0.74	0.73	0.72	0.71	0.71	0.71	0.72	0.72	0.73	0.73	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 1.72 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

53	52.21	51.04	48.82	47.18	45.36	44.32	45.47	46.73	48.7	50.96	52.8	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

22.92	22.58	22.1	21.21	20.55	19.82	19.42	19.9	20.41	21.2	22.1	22.84	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

32.21	31.04	29.87	28.7	27.52	26.35	26.35	27.52	28.7	29.87	31.04	32.21	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 99.53 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

108.13	105.82	103.01	98.73	95.26	91.53	90.09	92.89	95.84	99.76	104.1	107.85	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

171.25	150.68	158.32	135.16	128.24	112.54	108.96	115.02	118.19	135.38	148.32	168.86	(45)

Distribution loss (46) = 0.15 x (45)

25.69	22.6	23.75	20.27	19.24	16.88	16.34	17.25	17.73	20.31	22.25	25.33	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

220.55 195.22 207.62 182.87 177.54 160.26 158.26 164.32 165.9 184.68 196.03 218.16 2231.41 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

220.55 195.22 207.62 182.87 177.54 160.26 158.26 164.32 165.9 184.68 196.03 218.16 2231.41 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

96.38 85.73 92.08 83.11 82.08 75.59 75.67 77.69 77.47 84.45 87.48 95.59 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

75.44	83.52	75.44	77.96	75.44	77.96	75.44	75.44	77.96	75.44	77.96	75.44	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

149.57	151.12	147.21	138.89	128.37	118.5	111.9	110.34	114.26	122.58	133.09	142.97	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	(71)

Water heating gains (Table 5)

129.55	127.57	123.77	115.43	110.32	104.99	101.71	104.42	107.59	113.51	121.51	128.48	(72)

Total internal gains

403.31	410.97	395.17	381.02	362.89	350.19	337.8	338.95	348.55	360.29	381.3	395.64	(73)

6. Solar gains

Solar gains in watts, calculated for each month

93.06	164.5	237.98	311.59	360.74	362.34	347.65	310.97	263.8	185.58	112.63	78.85	(83)

Total gains – internal and solar (watts)

496.37	575.47	633.15	692.62	723.63	712.53	685.45	649.92	612.35	545.87	493.93	474.49	(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, ⍰1,m (see Table 9a)

0.86	0.8	0.72	0.59	0.46	0.32	0.23	0.25	0.4	0.63	0.8	0.88	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

20.08	20.34	20.59	20.83	20.94	20.99	21	21	20.97	20.82	20.45	20.03	(87)

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

20.3	20.31	20.31	20.32	20.32	20.33	20.33	20.33	20.33	20.32	20.32	20.31	(88)

Roof Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.85	0.79	0.7	0.57	0.43	0.29	0.2	0.22	0.36	0.6	0.78	0.86	(89)

Roof Mean internal temperature in the rest of dwelling T2

19.47	19.72	19.96	20.18	20.28	20.32	20.33	20.33	20.31	20.18	19.84	19.44	(90)

Living area fraction 0.49 (91)

Mean internal temperature (for the whole dwelling)

19.76	20.02	20.27	20.49	20.6	20.65	20.65	20.65	20.63	20.49	20.13	19.73	(92)

Adjusted mean internal temperature:

19.76	20.02	20.27	20.49	20.6	20.65	20.65	20.65	20.63	20.49	20.13	19.73	(93)

8. Space heating requirement

Utilisation factor for gains,

0.84	0.78	0.7	0.57	0.44	0.3	0.21	0.24	0.38	0.61	0.77	0.85	(94)

Useful gains, mGm , W

417.07	447.51	441.29	396.19	317.29	216.71	146.21	152.74	233.28	331.24	382.68	404.92	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

584.71	569.69	517.03	428.12	327.55	218.66	146.6	153.31	237.87	363.94	482.93	579.23	(97)

Space heating requirement for each month

124.73	82.11	56.35	22.99	7.64	0	0	0	0	24.33	72.17	129.68	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

124.73	82.11	56.35	22.99	7.64	0	0	0	0	24.33	72.17	129.68	(98c)

Space heating requirement in kWh/m²/year 10.22 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	546.01	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2231.41	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	27.77	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												108.98	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												108.98	(331)
Electricity for lighting (calculated in Appendix L)												126.51	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	7.86	13.37	23.47	31.26	37.42	36.3	35.61	31.48	24.76	16.94	9.27	6.47	274.21 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	1.89	4.92	12.53	23.17	34.57	36.28	35.26	27.39	16.97	7.81	2.7	1.41	204.9 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													3012.9

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		24.24	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		99.07	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	17.97	(349)
Electricity for lighting	0	20.86	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-56.67	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	197.48	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.74	(357)
SAP rating	87.98	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			4	(372)
Total CO2 associated with heat networks			98.43	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			98.43	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			15.12	(378)
Electricity for lighting			18.26	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			70.96	(383)
Total CO2, kg/year			1.39	(384)
EI rating (section 14)			99.01	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			42.57	(472)
Total CO2 associated with heat networks			1084.8	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1084.8	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			164.87	(478)
Electricity for lighting			194.04	(479)
energy saved or generated				
energy saved or generated	0		-498.38	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			945.32	(383)
Dwelling CO2 Emission Rate			18.57	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:43

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	87 m^2
Site Reference	B26	Plot Reference	B26
Address	B26, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*11.71 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.02 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*61.78 kWh_{PE}/m^2*	
Dwelling primary energy	14.61 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*32.3 kWh/m^2*	
Dwelling fabric energy efficiency	30.6 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	54.81	0.15
Exposed wall: Corridor	4.59	0.15
Exposed wall: Stair	14.04	0.15
Exposed wall: Lift	7.56	0.15
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North West	N/A	1 **(!)**
2, Windows (1)	1.08	North West	0.7	1.2
3, Windows (1)	2.34	North West	0.7	1.2
4, Windows (1)	1.08	North	0.7	1.2
5, Windows (1)	3.12	North	0.7	1.2
6, Windows (1)	5.52	North	0.7	1.2
7, Windows (1)	2.34	East	0.7	1.2
8, Windows (1)	2.34	East	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.55 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	1.07 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: B26
Dwelling Type: New Dwelling Design Stage

B26
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	86.6	(1a) x	2.6	(2a) =	225.16	(3a)
Total floor area TFA					86.6	(4)
Dwelling volume					225.16	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	3	3	(19)
Shelter factor		0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	20.4		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	12.15	1134	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		100.98	(31)
Party Wall	0	0	(32)
Party floor		3464	(32a)
Party ceiling		2598	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		34.71	(33)
Heat capacity Cm = ∑(A x k)		7925	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		91.51	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		5.05	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		5.05	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		39.76	(37)

Ventilation heat loss calculated monthly

18.07	17.86	17.64	16.56	16.34	15.26	15.26	15.05	15.7	16.34	16.78	17.21	(38)

Heat transfer coefficient, W/K

57.84	57.62	57.4	56.32	56.11	55.03	55.03	54.81	55.46	56.11	56.54	56.97	(39)

Heat loss parameter (HLP), W/m²K

0.67	0.67	0.66	0.65	0.65	0.64	0.64	0.63	0.64	0.65	0.65	0.66	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N		2.58	(42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

67.42	66.4	64.93	62.1	60.02	57.69	56.37	57.84	59.44	61.94	64.82	67.16	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

29.11	28.68	28.07	26.95	26.11	25.18	24.67	25.28	25.94	26.93	28.08	29.02	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

41.01	39.52	38.03	36.54	35.05	33.56	33.56	35.05	36.54	38.03	39.52	41.01	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J)	126.61	(43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

137.54	134.61	131.03	125.59	121.17	116.43	114.6	118.16	121.92	126.9	132.43	137.19	1517.56	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

217.83	191.68	201.39	171.93	163.12	143.16	138.6	146.31	150.34	172.21	188.66	214.8	2100.02	(45)

Distribution loss (46) = 0.15 x (45)

32.68	28.75	30.21	25.79	24.47	21.47	20.79	21.95	22.55	25.83	28.3	32.22	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel	0	(47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day):	1.4	(48)

Temperature factor from Table 2b	0.6	(49)
Energy lost from water storage, kWh/day (48) x (49) =	0.84	(50)
b) If manufacturer's declared loss factor is not known :		
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/day	0	(54)
Enter (50) or (54) in (55)	0.84	(55)

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

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,
(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m
where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(57)

Primary circuit loss for each month from Table 3
modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26	(59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0	0	0	0	0	0	0	0	0	0	0	0	(61)

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

267.14	236.21	250.69	219.64	212.43	190.87	187.9	195.61	198.05	221.51	236.38	264.1	2680.52	(62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0	0	0	0	0	0	0	0	0	0	0	0	(63b)

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

0	0	0	0	0	0	0	0	0	0	0	0	(63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

267.14	236.21	250.69	219.64	212.43	190.87	187.9	195.61	198.05	221.51	236.38	264.1	2680.52	(64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0	0	0	0	0	0	0	0	0	0	0	0	(64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

111.87	99.36	106.4	95.34	93.68	85.77	85.53	88.09	88.16	96.7	100.9	110.86	(65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

128.81	128.81	128.81	128.81	128.81	128.81	128.81	128.81	128.81	128.81	128.81	128.81	(66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

117.87	130.5	117.87	121.8	117.87	121.8	117.87	117.87	121.8	117.87	121.8	117.87	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

232.68	235.1	229.01	216.06	199.71	184.34	174.07	171.66	177.74	190.7	207.05	222.42	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

35.88	35.88	35.88	35.88	35.88	35.88	35.88	35.88	35.88	35.88	35.88	35.88	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	(71)

Water heating gains (Table 5)

150.37	147.85	143.01	132.41	125.91	119.12	114.95	118.4	122.44	129.97	140.14	149.01	(72)

Total internal gains

562.56	575.09	551.54	531.91	505.14	486.91	468.54	469.57	483.63	500.18	530.63	550.94	(73)

6. Solar gains

Solar gains in watts, calculated for each month

51.05	99.52	168.8	262.69	342.27	360.69	339.07	276.65	200.91	118.85	63.45	42.19	(83)

Total gains – internal and solar (watts)

613.61	674.61	720.34	794.61	847.4	847.6	807.61	746.23	684.54	619.04	594.08	593.13	(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, ⍰1,m (see Table 9a)

0.92	0.88	0.83	0.72	0.57	0.41	0.3	0.33	0.53	0.76	0.88	0.92	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.78	20	20.3	20.67	20.88	20.97	20.99	20.99	20.93	20.66	20.2	19.76	(87)

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

20.37	20.37	20.37	20.38	20.39	20.4	20.4	20.4	20.39	20.39	20.38	20.38	(88)

Roof Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.91	0.87	0.82	0.7	0.54	0.37	0.26	0.29	0.49	0.73	0.86	0.91	(89)

Roof Mean internal temperature in the rest of dwelling T2

19.25	19.46	19.75	20.1	20.29	20.38	20.39	20.4	20.35	20.1	19.66	19.23	(90)

Living area fraction 0.33 (91)

Mean internal temperature (for the whole dwelling)

19.43	19.64	19.93	20.29	20.49	20.58	20.59	20.59	20.54	20.29	19.84	19.41	(92)

Adjusted mean internal temperature:

19.43	19.64	19.93	20.29	20.49	20.58	20.59	20.59	20.54	20.29	19.84	19.41	(93)

8. Space heating requirement

Utilisation factor for gains,

0.89	0.86	0.81	0.69	0.54	0.38	0.27	0.31	0.5	0.73	0.85	0.9	(94)

Useful gains, mGm , W

548.3	580.18	580.8	550.36	461.49	322.69	218.47	227.78	340.55	451.71	505.44	534.53	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

874.88	849.44	771.06	641.51	493.23	329.03	219.83	229.88	357.32	543.42	720.32	866.44	(97)

Space heating requirement for each month

242.97	180.95	141.55	65.63	23.62	0	0	0	0	68.23	154.71	246.94	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

242.97	180.95	141.55	65.63	23.62	0	0	0	0	68.23	154.71	246.94	(98c)

Space heating requirement in kWh/m²/year 12.99 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1180.82	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2680.52	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	38.61	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												188.85	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												188.85	(331)
Electricity for lighting (calculated in Appendix L)												197.66	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	13.19	22.32	38.94	51.49	61.27	59.27	58.14	51.59	40.82	28.17	15.53	10.87	451.6 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	3.37	8.74	22.2	40.96	61	63.99	62.23	48.4	30.05	13.86	4.81	2.51	362.12 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													4247.85

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		52.43	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		119.02	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	31.14	(349)
Electricity for lighting	0	32.59	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-94.71	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	232.47	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.64	(357)
SAP rating	89.69	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Where the heat network is listed in the PCDB:				
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			5.62	(372)
Total CO2 associated with heat networks			136.91	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			136.91	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			26.2	(378)
Electricity for lighting			28.53	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			88.35	(383)
Total CO2, kg/year			1.02	(384)
EI rating (section 14)			99.1	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			59.41	(472)
Total CO2 associated with heat networks			1508.38	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1508.38	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			285.7	(478)
Electricity for lighting			303.17	(479)
energy saved or generated				
energy saved or generated	0		-832.04	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1265.21	(383)
Dwelling CO2 Emission Rate			14.61	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:44

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	71 m^2
Site Reference	B37	Plot Reference	B37
Address	B37, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*11.54 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.05 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*61 kWh_{PE}/m^2*	
Dwelling primary energy	14.91 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*27.1 kWh/m^2*	
Dwelling fabric energy efficiency	27.2 kWh/m^2	FAIL

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	0	PW (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	49.23	0.15
Exposed wall: Corridor	1.89	0.15
Party wall: PW	19.71	0 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North	N/A	1 **(!)**
2, Windows (1)	2.34	North West	0.7	1.2
3, Windows (1)	2.34	North West	0.7	1.2
4, Windows (1)	5.52	South	0.7	1.2
5, Windows (1)	3.12	South	0.7	1.2
6, Windows (1)	2.34	South West	0.7	1.2
7, Windows (1)	2.34	South West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.88 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: B37
Dwelling Type: New Dwelling Design Stage

B37
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	71.3	(1a) x	2.6	(2a) =	185.38	(3a)
Total floor area TFA					71.3	(4)
Dwelling volume					185.38	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	3	3	(19)
Shelter factor		0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	20.61		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	7.67	715.68	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		71.28	(31)
Party Wall	0	394.2	(32)
Party floor		2852	(32a)
Party ceiling		2139	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		30.44	(33)
Heat capacity Cm = ∑(A x k)		6829.88	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		95.79	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		3.55	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		3.55	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		33.99	(37)

Ventilation heat loss calculated monthly

14.88	14.7	14.52	13.63	13.46	12.57	12.57	12.39	12.92	13.46	13.81	14.17	(38)

Heat transfer coefficient, W/K

48.87	48.69	48.51	47.62	47.45	46.56	46.56	46.38	46.91	47.45	47.8	48.16	(39)

Heat loss parameter (HLP), W/m²K

0.69	0.68	0.68	0.67	0.67	0.65	0.65	0.65	0.66	0.67	0.67	0.68	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 2.28 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

62.4	61.46	60.1	57.48	55.55	53.4	52.18	53.53	55.02	57.33	60	62.16	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

26.96	26.56	25.99	24.95	24.18	23.31	22.85	23.41	24.02	24.94	26	26.87	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

37.95	36.57	35.19	33.81	32.43	31.05	31.05	32.43	33.81	35.19	36.57	37.95	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 117.19 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

127.31	124.59	121.28	116.25	112.16	107.77	106.08	109.37	112.85	117.46	122.57	126.98	1404.68	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

201.63	177.42	186.41	159.14	150.99	132.51	128.29	135.43	139.15	159.4	174.63	198.82	1943.82	(45)

Distribution loss (46) = 0.15 x (45)

30.24	26.61	27.96	23.87	22.65	19.88	19.24	20.31	20.87	23.91	26.19	29.82	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b	0.6	(49)
Energy lost from water storage, kWh/day (48) x (49) =	0.84	(50)
b) If manufacturer's declared loss factor is not known :		
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/day	0	(54)
Enter (50) or (54) in (55)	0.84	(55)

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

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,
(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m
where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(57)

Primary circuit loss for each month from Table 3
modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26	(59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0	0	0	0	0	0	0	0	0	0	0	0	(61)

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

250.93	221.95	235.71	206.85	200.29	180.22	177.59	184.73	186.87	208.7	222.34	248.12	2524.31	(62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0	0	0	0	0	0	0	0	0	0	0	0	(63b)

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

0	0	0	0	0	0	0	0	0	0	0	0	(63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

250.93	221.95	235.71	206.85	200.29	180.22	177.59	184.73	186.87	208.7	222.34	248.12	2524.31	(64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0	0	0	0	0	0	0	0	0	0	0	0	(64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

106.48	94.62	101.42	91.08	89.65	82.23	82.1	84.47	84.44	92.44	96.23	105.55	(65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

113.86	113.86	113.86	113.86	113.86	113.86	113.86	113.86	113.86	113.86	113.86	113.86	(66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

101.03	111.86	101.03	104.4	101.03	104.4	101.03	101.03	104.4	101.03	104.4	101.03	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

200.31	202.39	197.15	186	171.93	158.7	149.86	147.78	153.02	164.17	178.24	191.47	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

34.39	34.39	34.39	34.39	34.39	34.39	34.39	34.39	34.39	34.39	34.39	34.39	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	-91.09	(71)

Water heating gains (Table 5)

143.12	140.8	136.32	126.5	120.49	114.21	110.35	113.54	117.28	124.25	133.66	141.87	(72)

Total internal gains

501.63	512.21	491.67	474.07	450.61	434.46	418.4	419.51	431.85	446.61	473.46	491.54	(73)

6. Solar gains

Solar gains in watts, calculated for each month

137.29	231.9	313.84	385.88	431.56	428.7	413.16	378.68	338.53	255.2	164.05	117.78	(83)

Total gains – internal and solar (watts)

638.92	744.11	805.5	859.95	882.17	863.16	831.56	798.19	770.39	701.81	637.51	609.31	(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, ⍰1,m (see Table 9a)

0.87	0.8	0.73	0.61	0.48	0.34	0.25	0.27	0.41	0.63	0.8	0.88	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

20.08	20.34	20.59	20.82	20.94	20.99	21	21	20.97	20.82	20.46	20.04	(87)

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

20.35	20.36	20.36	20.37	20.37	20.38	20.38	20.38	20.38	20.37	20.37	20.36	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.85	0.79	0.71	0.59	0.45	0.31	0.21	0.23	0.38	0.6	0.78	0.87	(89)

Roof

Mean internal temperature in the rest of dwelling T2

19.51	19.77	20	20.22	20.32	20.37	20.38	20.38	20.36	20.23	19.89	19.48	(90)

Living area fraction 0.38 (91)

Mean internal temperature (for the whole dwelling)

19.73	19.99	20.22	20.45	20.56	20.61	20.62	20.62	20.59	20.46	20.1	19.69	(92)

Adjusted mean internal temperature:

19.73	19.99	20.22	20.45	20.56	20.61	20.62	20.62	20.59	20.46	20.1	19.69	(93)

8. Space heating requirement

Utilisation factor for gains,

0.84	0.78	0.7	0.59	0.46	0.32	0.22	0.24	0.39	0.61	0.77	0.86	(94)

Useful gains, mGm , W

537.8	578.5	566.29	505.66	405.22	276.81	186.4	194.78	298.57	426.14	493.92	521.19	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

754	734.6	665.66	549.81	420.2	279.69	186.97	195.56	304.61	467.6	621.65	746.1	(97)

Space heating requirement for each month

160.86	104.9	73.93	31.79	11.15	0	0	0	0	30.84	91.96	167.33	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

160.86	104.9	73.93	31.79	11.15	0	0	0	0	30.84	91.96	167.33	(98c)

Space heating requirement in kWh/m²/year 9.44 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	706.4	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2524.31	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	32.31	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												152.66	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												152.66	(331)
Electricity for lighting (calculated in Appendix L)												169.43	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	10.91	18.51	32.38	42.97	51.27	49.65	48.7	43.14	34.04	23.4	12.86	8.98	376.82 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.71	7.04	17.9	33.07	49.29	51.72	50.29	39.09	24.25	11.17	3.87	2.01	292.41 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													3552.79

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		31.36	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		112.08	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	25.17	(349)
Electricity for lighting	0	27.94	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-78.48	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	210.07	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.65	(357)
SAP rating	89.46	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			4.67	(372)
Total CO2 associated with heat networks			114.51	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			114.51	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			21.18	(378)
Electricity for lighting			24.45	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			75.17	(383)
Total CO2, kg/year			1.05	(384)
EI rating (section 14)			99.13	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			49.57	(472)
Total CO2 associated with heat networks			1261.89	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1261.89	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			230.94	(478)
Electricity for lighting			259.87	(479)
energy saved or generated				
energy saved or generated	0		-689.82	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1062.89	(383)
Dwelling CO2 Emission Rate			14.91	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:46

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	51 m^2
Site Reference	B38	Plot Reference	B38
Address	B38, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*13.66 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.39 $kgCO_2/m^2$	**OK**
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*72.71 kWh_{PE}/m^2*	
Dwelling primary energy	18.57 kWh_{PE}/m^2	**OK**
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*28.3 kWh/m^2*	
Dwelling fabric energy efficiency	29.3 kWh/m^2	**FAIL**

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	**OK**
Party walls	*0.2*	0	PW (0)	**N/A**
Curtain walls	*1.6*	0	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.17	2 (1.2)	**OK**
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	13.65	0.15
Exposed wall: Corridor	12.42	0.15
Exposed wall: Stair	14.04	0.15
Party wall: PW	19.71	0 **(!)**
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North West	N/A	1 **(!)**
2, Windows (1)	5.52	South East	0.7	1.2
3, Windows (1)	3.12	South East	0.7	1.2
4, Windows (1)	5.52	West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))				
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction				
Main element	**Junction detail**	**Source**	**Psi value [W/mK]**	**Drawing / reference**
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.63 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: B38
Dwelling Type: New Dwelling Design Stage

B38
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	50.9	(1a) x	2.6	(2a) =	132.34	(3a)
Total floor area TFA					50.9	(4)
Dwelling volume					132.34	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80	=	0 (6a)
Open chimneys	0	x	20	=	0 (6b)
Chimneys / flues attached to closed fire	0	x	10	=	0 (6c)
Flues attached to solid fuel boiler	0	x	20	=	0 (6d)
Flues attached to other heater	0	x	35	=	0 (6e)
Number of blocked chimneys	0	x	20	=	0 (6f)
Number of intermittent extract fans	0	x	10	=	0 (7a)
Number of passive vents	0	x	10	=	0 (7b)
Number of flueless gas fires	0	x	40	=	0 (7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	3	3	(19)
Shelter factor		0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	16.21		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	6.02	561.54	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		56.43	(31)
Party Wall	0	394.2	(32)
Party floor		2036	(32a)
Party ceiling		1527	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		24.39	(33)
Heat capacity Cm = ∑(A x k)		5247.74	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		103.1	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		2.8	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		2.8	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		27.19	(37)

Ventilation heat loss calculated monthly

10.62	10.49	10.37	9.73	9.61	8.97	8.97	8.84	9.23	9.61	9.86	10.11	(38)

Heat transfer coefficient, W/K

37.81	37.69	37.56	36.92	36.8	36.16	36.16	36.04	36.42	36.8	37.05	37.3	(39)

Heat loss parameter (HLP), W/m²K

0.74	0.74	0.74	0.73	0.72	0.71	0.71	0.71	0.72	0.72	0.73	0.73	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N 1.72 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

53	52.21	51.04	48.82	47.18	45.36	44.32	45.47	46.73	48.7	50.96	52.8	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

22.92	22.58	22.1	21.21	20.55	19.82	19.42	19.9	20.41	21.2	22.1	22.84	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

32.21	31.04	29.87	28.7	27.52	26.35	26.35	27.52	28.7	29.87	31.04	32.21	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 99.53 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

108.13	105.82	103.01	98.73	95.26	91.53	90.09	92.89	95.84	99.76	104.1	107.85	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

171.25	150.68	158.32	135.16	128.24	112.54	108.96	115.02	118.19	135.38	148.32	168.86	(45)

Distribution loss (46) = 0.15 x (45)

25.69	22.6	23.75	20.27	19.24	16.88	16.34	17.25	17.73	20.31	22.25	25.33	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

220.55 195.22 207.62 182.87 177.54 160.26 158.26 164.32 165.9 184.68 196.03 218.16 2231.41 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

220.55 195.22 207.62 182.87 177.54 160.26 158.26 164.32 165.9 184.68 196.03 218.16 2231.41 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

96.38 85.73 92.08 83.11 82.08 75.59 75.67 77.69 77.47 84.45 87.48 95.59 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 85.83 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

75.44	83.52	75.44	77.96	75.44	77.96	75.44	75.44	77.96	75.44	77.96	75.44	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

149.57	151.12	147.21	138.89	128.37	118.5	111.9	110.34	114.26	122.58	133.09	142.97	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	31.58	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	-68.66	(71)

Water heating gains (Table 5)

129.55	127.57	123.77	115.43	110.32	104.99	101.71	104.42	107.59	113.51	121.51	128.48	(72)

Total internal gains

403.31	410.97	395.17	381.02	362.89	350.19	337.8	338.95	348.55	360.29	381.3	395.64	(73)

6. Solar gains

Solar gains in watts, calculated for each month

93.06	164.5	237.98	311.59	360.74	362.34	347.65	310.97	263.8	185.58	112.63	78.85	(83)

Total gains – internal and solar (watts)

496.37	575.47	633.15	692.62	723.63	712.53	685.45	649.92	612.35	545.87	493.93	474.49	(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, ⍰1,m (see Table 9a)

0.86	0.8	0.72	0.59	0.46	0.32	0.23	0.25	0.4	0.63	0.8	0.88	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

20.08	20.34	20.59	20.83	20.94	20.99	21	21	20.97	20.82	20.45	20.03	(87)

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

20.3	20.31	20.31	20.32	20.32	20.33	20.33	20.33	20.33	20.32	20.32	20.31	(88)

Roof Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.85	0.79	0.7	0.57	0.43	0.29	0.2	0.22	0.36	0.6	0.78	0.86	(89)

Roof Mean internal temperature in the rest of dwelling T2

19.47	19.72	19.96	20.18	20.28	20.32	20.33	20.33	20.31	20.18	19.84	19.44	(90)

Living area fraction 0.49 (91)

Mean internal temperature (for the whole dwelling)

19.76	20.02	20.27	20.49	20.6	20.65	20.65	20.65	20.63	20.49	20.13	19.73	(92)

Adjusted mean internal temperature:

19.76	20.02	20.27	20.49	20.6	20.65	20.65	20.65	20.63	20.49	20.13	19.73	(93)

8. Space heating requirement

Utilisation factor for gains,

0.84	0.78	0.7	0.57	0.44	0.3	0.21	0.24	0.38	0.61	0.77	0.85	(94)

Useful gains, mGm , W

417.07	447.51	441.29	396.19	317.29	216.71	146.21	152.74	233.28	331.24	382.68	404.92	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

584.71	569.69	517.03	428.12	327.55	218.66	146.6	153.31	237.87	363.94	482.93	579.23	(97)

Space heating requirement for each month

124.73	82.11	56.35	22.99	7.64	0	0	0	0	24.33	72.17	129.68	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

124.73	82.11	56.35	22.99	7.64	0	0	0	0	24.33	72.17	129.68	(98c)

Space heating requirement in kWh/m²/year 10.22 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	546.01	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2231.41	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	27.77	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												108.98	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												108.98	(331)
Electricity for lighting (calculated in Appendix L)												126.51	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	7.86	13.37	23.47	31.26	37.42	36.3	35.61	31.48	24.76	16.94	9.27	6.47	274.21 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	1.89	4.92	12.53	23.17	34.57	36.28	35.26	27.39	16.97	7.81	2.7	1.41	204.9 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													3012.9

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		24.24	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		99.07	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	17.97	(349)
Electricity for lighting	0	20.86	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-56.67	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	197.48	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.74	(357)
SAP rating	87.98	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			4	(372)
Total CO2 associated with heat networks			98.43	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			98.43	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			15.12	(378)
Electricity for lighting			18.26	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			70.96	(383)
Total CO2, kg/year			1.39	(384)
EI rating (section 14)			99.01	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			42.57	(472)
Total CO2 associated with heat networks			1084.8	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1084.8	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			164.87	(478)
Electricity for lighting			194.04	(479)
energy saved or generated				
energy saved or generated	0		-498.38	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			945.32	(383)
Dwelling CO2 Emission Rate			18.57	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:47

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	87 m^2
Site Reference	B39	Plot Reference	B39
Address	B39, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*11.71 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.02 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*61.78 kWh_{PE}/m^2*	
Dwelling primary energy	14.61 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*32.3 kWh/m^2*	
Dwelling fabric energy efficiency	30.6 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Exposed (0.15)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	N/A	N/A	**N/A**
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Exposed	54.81	0.15
Exposed wall: Corridor	4.59	0.15
Exposed wall: Stair	14.04	0.15
Exposed wall: Lift	7.56	0.15
Exposed roof: Exposed Roof	0	0 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North West	N/A	1 **(!)**
2, Windows (1)	1.08	North West	0.7	1.2
3, Windows (1)	2.34	North West	0.7	1.2
4, Windows (1)	1.08	North	0.7	1.2
5, Windows (1)	3.12	North	0.7	1.2
6, Windows (1)	5.52	North	0.7	1.2
7, Windows (1)	2.34	East	0.7	1.2
8, Windows (1)	2.34	East	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.55 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	1.07 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: B39
Dwelling Type: New Dwelling Design Stage

B39
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	86.6	(1a) x	2.6	(2a) =	225.16	(3a)
Total floor area TFA					86.6	(4)
Dwelling volume					225.16	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	3	3	(19)
Shelter factor		0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	20.4		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	12.15	1134	(29a)
Roof	0	0	(30)

Total area of external elements ∑A, m²		100.98	(31)
Party Wall	0	0	(32)
Party floor		3464	(32a)
Party ceiling		2598	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		34.71	(33)
Heat capacity Cm = ∑(A x k)		7925	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		91.51	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		5.05	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		5.05	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		39.76	(37)

Ventilation heat loss calculated monthly

18.07	17.86	17.64	16.56	16.34	15.26	15.26	15.05	15.7	16.34	16.78	17.21	(38)

Heat transfer coefficient, W/K

57.84	57.62	57.4	56.32	56.11	55.03	55.03	54.81	55.46	56.11	56.54	56.97	(39)

Heat loss parameter (HLP), W/m²K

0.67	0.67	0.66	0.65	0.65	0.64	0.64	0.63	0.64	0.65	0.65	0.66	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N		2.58	(42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

67.42	66.4	64.93	62.1	60.02	57.69	56.37	57.84	59.44	61.94	64.82	67.16	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

29.11	28.68	28.07	26.95	26.11	25.18	24.67	25.28	25.94	26.93	28.08	29.02	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

41.01	39.52	38.03	36.54	35.05	33.56	33.56	35.05	36.54	38.03	39.52	41.01	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J)	126.61	(43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

137.54	134.61	131.03	125.59	121.17	116.43	114.6	118.16	121.92	126.9	132.43	137.19	1517.56	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

217.83	191.68	201.39	171.93	163.12	143.16	138.6	146.31	150.34	172.21	188.66	214.8	2100.02	(45)

Distribution loss (46) = 0.15 x (45)

32.68	28.75	30.21	25.79	24.47	21.47	20.79	21.95	22.55	25.83	28.3	32.22	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel	0	(47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day):	1.4	(48)

Temperature factor from Table 2b	0.6	(49)
Energy lost from water storage, kWh/day (48) x (49) =	0.84	(50)
b) If manufacturer's declared loss factor is not known :		
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/day	0	(54)
Enter (50) or (54) in (55)	0.84	(55)

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

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,
(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m
where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(57)

Primary circuit loss for each month from Table 3
modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26	(59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0	0	0	0	0	0	0	0	0	0	0	0	(61)

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

267.14	236.21	250.69	219.64	212.43	190.87	187.9	195.61	198.05	221.51	236.38	264.1	2680.52	(62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0	0	0	0	0	0	0	0	0	0	0	0	(63b)

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

0	0	0	0	0	0	0	0	0	0	0	0	(63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

267.14	236.21	250.69	219.64	212.43	190.87	187.9	195.61	198.05	221.51	236.38	264.1	2680.52	(64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0	0	0	0	0	0	0	0	0	0	0	0	(64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

111.87	99.36	106.4	95.34	93.68	85.77	85.53	88.09	88.16	96.7	100.9	110.86	(65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

128.81	128.81	128.81	128.81	128.81	128.81	128.81	128.81	128.81	128.81	128.81	128.81	(66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

117.87	130.5	117.87	121.8	117.87	121.8	117.87	117.87	121.8	117.87	121.8	117.87	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

232.68	235.1	229.01	216.06	199.71	184.34	174.07	171.66	177.74	190.7	207.05	222.42	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

35.88	35.88	35.88	35.88	35.88	35.88	35.88	35.88	35.88	35.88	35.88	35.88	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	-103.05	(71)

Water heating gains (Table 5)

150.37	147.85	143.01	132.41	125.91	119.12	114.95	118.4	122.44	129.97	140.14	149.01	(72)

Total internal gains

562.56	575.09	551.54	531.91	505.14	486.91	468.54	469.57	483.63	500.18	530.63	550.94	(73)

6. Solar gains

Solar gains in watts, calculated for each month

51.05	99.52	168.8	262.69	342.27	360.69	339.07	276.65	200.91	118.85	63.45	42.19	(83)

Total gains – internal and solar (watts)

613.61	674.61	720.34	794.61	847.4	847.6	807.61	746.23	684.54	619.04	594.08	593.13	(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, ⍰1,m (see Table 9a)

0.92	0.88	0.83	0.72	0.57	0.41	0.3	0.33	0.53	0.76	0.88	0.92	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.78	20	20.3	20.67	20.88	20.97	20.99	20.99	20.93	20.66	20.2	19.76	(87)

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

20.37	20.37	20.37	20.38	20.39	20.4	20.4	20.4	20.39	20.39	20.38	20.38	(88)

Roof Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.91	0.87	0.82	0.7	0.54	0.37	0.26	0.29	0.49	0.73	0.86	0.91	(89)

Roof Mean internal temperature in the rest of dwelling T2

19.25	19.46	19.75	20.1	20.29	20.38	20.39	20.4	20.35	20.1	19.66	19.23	(90)

Living area fraction 0.33 (91)

Mean internal temperature (for the whole dwelling)

19.43	19.64	19.93	20.29	20.49	20.58	20.59	20.59	20.54	20.29	19.84	19.41	(92)

Adjusted mean internal temperature:

19.43	19.64	19.93	20.29	20.49	20.58	20.59	20.59	20.54	20.29	19.84	19.41	(93)

8. Space heating requirement

Utilisation factor for gains,

0.89	0.86	0.81	0.69	0.54	0.38	0.27	0.31	0.5	0.73	0.85	0.9	(94)

Useful gains, mGm , W

548.3	580.18	580.8	550.36	461.49	322.69	218.47	227.78	340.55	451.71	505.44	534.53	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

874.88	849.44	771.06	641.51	493.23	329.03	219.83	229.88	357.32	543.42	720.32	866.44	(97)

Space heating requirement for each month

242.97	180.95	141.55	65.63	23.62	0	0	0	0	68.23	154.71	246.94	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

242.97	180.95	141.55	65.63	23.62	0	0	0	0	68.23	154.71	246.94	(98c)

Space heating requirement in kWh/m²/year 12.99 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1180.82	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2680.52	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	38.61	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												188.85	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												188.85	(331)
Electricity for lighting (calculated in Appendix L)												197.66	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	13.19	22.32	38.94	51.49	61.27	59.27	58.14	51.59	40.82	28.17	15.53	10.87	451.6 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	3.37	8.74	22.2	40.96	61	63.99	62.23	48.4	30.05	13.86	4.81	2.51	362.12 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													4247.85

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		52.43	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		119.02	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	31.14	(349)
Electricity for lighting	0	32.59	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-94.71	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	232.47	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.64	(357)
SAP rating	89.69	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Where the heat network is listed in the PCDB:				
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			5.62	(372)
Total CO2 associated with heat networks			136.91	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			136.91	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			26.2	(378)
Electricity for lighting			28.53	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			88.35	(383)
Total CO2, kg/year			1.02	(384)
EI rating (section 14)			99.1	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			59.41	(472)
Total CO2 associated with heat networks			1508.38	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1508.38	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			285.7	(478)
Electricity for lighting			303.17	(479)
energy saved or generated				
energy saved or generated	0		-832.04	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1265.21	(383)
Dwelling CO2 Emission Rate			14.61	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:48

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	74 m^2
Site Reference	B410	Plot Reference	B410
Address	B410, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*13.58 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	1.43 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*71.93 kWh_{PE}/m^2*	
Dwelling primary energy	19 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*37.6 kWh/m^2*	
Dwelling fabric energy efficiency	37.2 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Terrace (0.15)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	0.1	Flat roof (0.1)	OK
Windows, doors, and roof windows	*1.6*	1.18	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Terrace	38.94	0.15
Exposed wall: Corridor	10.26	0.15
Exposed wall: Stair	8.64	0.15
Exposed wall: Exposed	19.98	0.15
Exposed roof: Flat roof	73.9	0.1 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North East	N/A	1 **(!)**
2, Windows (1)	1.08	North West	0.7	1.2
3, Windows (1)	1.08	North West	0.7	1.2
4, Windows (1)	5.52	South West	0.7	1.2
5, Windows (1)	3.12	South West	0.7	1.2
6, Windows (1)	3.12	South	0.7	1.2
7, Windows (1)	3.12	South	0.7	1.2
8, Windows (1)	2.34	South East	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.91 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: B410
Dwelling Type: New Dwelling Design Stage

B410
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	73.9	(1a) x	2.6	(2a) =	192.14	(3a)
Total floor area TFA					73.9	(4)
Dwelling volume					192.14	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	3	3	(19)
Shelter factor		0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	22.19		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	11.67	1089.48	(29a)
Roof	7.39	665.1	(30)

Total area of external elements ∑A, m²		173.26	(31)
Party Wall	0	0	(32)
Party floor		2956	(32a)
Party ceiling		0	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		43.41	(33)
Heat capacity Cm = ∑(A x k)		5439.58	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		73.61	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		8.65	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		8.65	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		52.06	(37)

Ventilation heat loss calculated monthly

15.42	15.24	15.05	14.13	13.95	13.03	13.03	12.84	13.39	13.95	14.32	14.68	(38)

Heat transfer coefficient, W/K

67.49	67.3	67.12	66.2	66.01	65.09	65.09	64.91	65.46	66.01	66.38	66.75	(39)

Heat loss parameter (HLP), W/m²K

0.91	0.91	0.91	0.9	0.89	0.88	0.88	0.88	0.89	0.89	0.9	0.9	(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirement

Assumed occupancy, N	2.34	(42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

63.4	62.45	61.06	58.41	56.44	54.26	53.02	54.39	55.9	58.25	60.97	63.16	(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

27.39	26.98	26.41	25.35	24.56	23.69	23.21	23.78	24.4	25.34	26.42	27.3	(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

38.56	37.16	35.76	34.36	32.95	31.55	31.55	32.95	34.36	35.76	37.16	38.56	(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J)	119.07	(43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

129.35	126.59	123.23	118.11	113.96	109.49	107.78	111.13	114.66	119.35	124.54	129.02	1427.22	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

204.87	180.27	189.4	161.69	153.41	134.64	130.35	137.6	141.39	161.95	177.43	202.01	1975.01	(45)

Distribution loss (46) = 0.15 x (45)

30.73	27.04	28.41	24.25	23.01	20.2	19.55	20.64	21.21	24.29	26.61	30.3	(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel	0	(47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day):	1.4	(48)

Temperature factor from Table 2b	0.6	(49)
Energy lost from water storage, kWh/day (48) x (49) =	0.84	(50)
b) If manufacturer's declared loss factor is not known :		
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/day	0	(54)
Enter (50) or (54) in (55)	0.84	(55)

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

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,
(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m
where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04	23.52	26.04	25.2	26.04	25.2	26.04	26.04	25.2	26.04	25.2	26.04	(57)

Primary circuit loss for each month from Table 3
modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26	21.01	23.26	22.51	23.26	22.51	23.26	23.26	22.51	23.26	22.51	23.26	(59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0	0	0	0	0	0	0	0	0	0	0	0	(61)

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

254.17	224.8	238.7	209.4	202.72	182.35	179.65	186.9	189.1	211.26	225.14	251.31	2555.5	(62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0	0	0	0	0	0	0	0	0	0	0	0	(63b)

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

0	0	0	0	0	0	0	0	0	0	0	0	(63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0	0	0	0	0	0	0	0	0	0	0	0	(63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

254.17	224.8	238.7	209.4	202.72	182.35	179.65	186.9	189.1	211.26	225.14	251.31	2555.5	(64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0	0	0	0	0	0	0	0	0	0	0	0	(64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

107.56	95.56	102.42	91.93	90.45	82.94	82.78	85.19	85.18	93.29	97.17	106.61	(65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

116.85	116.85	116.85	116.85	116.85	116.85	116.85	116.85	116.85	116.85	116.85	116.85	(66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

104.02	115.16	104.02	107.48	104.02	107.48	104.02	104.02	107.48	104.02	107.48	104.02		(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

206.22	208.36	202.97	191.49	177	163.38	154.28	152.14	157.53	169.01	183.5	197.12		(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

34.68	34.68	34.68	34.68	34.68	34.68	34.68	34.68	34.68	34.68	34.68	34.68		(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0		(70)

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

-93.48	-93.48	-93.48	-93.48	-93.48	-93.48	-93.48	-93.48	-93.48	-93.48	-93.48	-93.48		(71)

Water heating gains (Table 5)

144.57	142.21	137.66	127.68	121.57	115.19	111.27	114.51	118.31	125.39	134.95	143.29		(72)

Total internal gains

512.86	523.79	502.7	484.71	460.64	444.11	427.62	428.72	441.38	456.47	483.99	502.49		(73)

6. Solar gains

Solar gains in watts, calculated for each month

157.19	265.35	357.91	436.87	484.8	479.69	463.11	427.34	385.11	291.76	187.81	134.85		(83)

Total gains – internal and solar (watts)

670.06	789.13	860.6	921.58	945.44	923.8	890.73	856.06	826.49	748.23	671.81	637.33		(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, ⍰1,m (see Table 9a)

0.87	0.82	0.76	0.66	0.55	0.42	0.31	0.33	0.49	0.68	0.82	0.88		(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

19.02	19.4	19.83	20.31	20.66	20.88	20.96	20.95	20.82	20.36	19.63	18.95		(87)

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

20.16	20.16	20.16	20.17	20.17	20.18	20.18	20.19	20.18	20.17	20.17	20.16		(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.86	0.8	0.74	0.64	0.52	0.37	0.26	0.28	0.44	0.65	0.8	0.87		(89)

Roof

Mean internal temperature in the rest of dwelling T2

18.35	18.72	19.13	19.59	19.91	20.11	20.16	20.16	20.05	19.65	18.96	18.29		(90)

Living area fraction 0.37 (91)

Mean internal temperature (for the whole dwelling)

18.6	18.97	19.39	19.85	20.19	20.39	20.46	20.45	20.33	19.91	19.21	18.54		(92)

Adjusted mean internal temperature:

18.6	18.97	19.39	19.85	20.19	20.39	20.46	20.45	20.33	19.91	19.21	18.54		(93)

8. Space heating requirement

Utilisation factor for gains,

0.83	0.78	0.72	0.63	0.52	0.38	0.27	0.3	0.45	0.64	0.78	0.84	(94)

Useful gains, mGm , W

555.48	612.19	616.33	577.02	487.94	353.28	243.82	253.85	370.53	481.18	521.74	536.28	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

964.8	947.07	864.97	725.15	560.23	377.02	251.06	262.94	408.04	614.73	803.87	956.88	(97)

Space heating requirement for each month

304.53	225.04	184.99	106.65	53.78	0	0	0	0	99.36	203.14	312.92	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

304.53	225.04	184.99	106.65	53.78	0	0	0	0	99.36	203.14	312.92	(98c)

Space heating requirement in kWh/m²/year 20.17 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1564.92	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2555.5	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	41.2	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												158.23	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												158.23	(331)
Electricity for lighting (calculated in Appendix L)												174.42	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	11.27	19.12	33.45	44.36	52.92	51.24	50.26	44.53	35.15	24.17	13.28	9.29	389.04 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	2.81	7.29	18.55	34.26	51.08	53.59	52.11	40.51	25.13	11.58	4.01	2.09	303.01 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													4453.07

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		69.48	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		113.46	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	26.09	(349)
Electricity for lighting	0	28.76	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-81.09	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	248.71	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.75	(357)
SAP rating	87.79	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)			0	(361)
Heat efficiency of CHP unit (e.g. 50%)			0	(362)
	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			6.03	(372)
Total CO2 associated with heat networks			146.13	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			146.13	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			21.95	(378)
Electricity for lighting			25.17	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			105.39	(383)
Total CO2, kg/year			1.43	(384)
EI rating (section 14)			98.81	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			63.52	(472)
Total CO2 associated with heat networks			1609.71	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1609.71	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			239.37	(478)
Electricity for lighting			267.54	(479)
energy saved or generated				
energy saved or generated	0		-712.69	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1403.92	(383)
Dwelling CO2 Emission Rate			19	(274)
Overall CO2 factor for heat network			0.39	(386)

Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Stroma SAP 10.2 SAP 10 program, 10.2

Date: Tue 12 Dec 2023 21:20:50

Project Information			
Assessed By	Ondrej Gajdos	Building Type	Flat, Semi-detached
OCDEA Registration	STRO006629	Assessment Date	2023-10-24

Dwelling Details			
Assessment Type	As designed	Total Floor Area	53 m^2
Site Reference	B411	Plot Reference	B411
Address	B411, Hornsey park road, LONDON, N8 0JY		

Client Details	
Name	Not Provided
Company	Not Provided
Address	Not Provided, Not Provided, WF10 5QU

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

1a Target emission rate and dwelling emission rate		
Fuel for main heating system	Heat network	
Target carbon dioxide emission rate	*17.74 $kgCO_2/m^2$*	
Dwelling carbon dioxide emission rate	2.02 $kgCO_2/m^2$	OK
1b Target primary energy rate and dwelling primary energy		
Target primary energy	*94.64 kWh_{PE}/m^2*	
Dwelling primary energy	25.41 kWh_{PE}/m^2	OK
1c Target fabric energy efficiency and dwelling fabric energy efficiency		
Target fabric energy efficiency	*48.2 kWh/m^2*	
Dwelling fabric energy efficiency	45.9 kWh/m^2	OK

2a Fabric U-values				
Element	***Maximum permitted average U-Value [W/m^2K]***	**Dwelling average U-Value [W/m^2K]**	**Element with highest individual U-Value**	
External walls	*0.26*	0.15	Terrace (0.15)	OK
Party walls	*0.2*	N/A	N/A	**N/A**
Curtain walls	*1.6*	N/A	N/A	**N/A**
Floors	*0.18*	N/A	N/A	**N/A**
Roofs	*0.16*	0.1	Flat roof (0.1)	OK
Windows, doors, and roof windows	*1.6*	1.17	2 (1.2)	OK
Rooflights	*2.2*	N/A	N/A	**N/A**

2b Envelope elements (better than typically expected values are flagged with a subsequent (!))		
Name	**Net area [m^2]**	**U-Value [W/m^2K]**
Exposed wall: Terrace	27.9	0.15
Exposed wall: Corridor	4.59	0.15
Exposed wall: Stair	41.31	0.15
Exposed wall: Lift	9.18	0.15
Exposed wall: Exposed	11.61	0.15
Exposed roof: Flat roof	52.7	0.1 **(!)**

2c Openings (better than typically expected values are flagged with a subsequent (!))				
Name	**Area [m^2]**	**Orientation**	**Frame factor**	**U-Value [W/m^2K]**
1, Doors	2.16	North West	N/A	1 **(!)**
2, Windows (1)	5.52	North	0.7	1.2
3, Windows (1)	3.12	North	0.7	1.2
4, Windows (1)	1.08	West	0.7	1.2
5, Windows (1)	2.34	West	0.7	1.2

2d Thermal bridging (better than typically expected values are flagged with a subsequent (!))
Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction

Main element	Junction detail	Source	Psi value [W/mK]	Drawing / reference
External wall	E2: Other lintels (including other steel lintels)	Not government-approved scheme	0.05	Not Provided

3 Air permeability (better than typically expected values are flagged with a subsequent (!))		
Maximum permitted air permeability at 50Pa	*8 m^3/hm^2*	
Dwelling air permeability at 50Pa	3 m^3/hm^2, Design value **(!)**	OK
Air permeability test certificate reference	Not Provided	

4 Space heating	
Main heating system 1: Heat network - Heat network	
Efficiency	0.0%
Emitter type	
Flow temperature	
System type	
Manufacturer	
Model	
Commissioning	
Secondary heating system: N/A	
Fuel	N/A
Efficiency	N/A
Commissioning	

5 Hot water	
Cylinder/store - type: Cylinder	
Capacity	180 litres
Declared heat loss	1.4 kWh/day
Primary pipework insulated	N/A
Manufacturer	
Model	
Commissioning	
Waste water heat recovery system 1 - type: N/A	
Efficiency	
Manufacturer	
Model	

6 Controls	
Main heating 1 - type: Charging system linked to use of heating, programmer and room thermostat	
Function	
Ecodesign class	
Manufacturer	
Model	
Water heating - type: Cylinder thermostat and HW separately timed	
Manufacturer	
Model	

7 Lighting		
Minimum permitted light source efficacy	*75 lm/W*	
Lowest light source efficacy	80 lm/W	OK
External lights control	N/A	

8 Mechanical ventilation		
System type: Balanced whole-house mechanical ventilation with heat recovery		
Maximum permitted specific fan power	*1.5 W/(l/s)*	
Specific fan power	0.54 W/(l/s)	OK
Minimum permitted heat recovery efficiency	*73%*	
Heat recovery efficiency	90%	OK
Manufacturer/Model		
Commissioning	Not Provided / Not Provided	

9 Local generation	
Technology type: **Photovoltaic system (1)**	
Peak power	0.65 kWp
Orientation	Horizontal
Pitch	Horizontal
Overshading	None or very little
Manufacturer	Not Provided
MCS certificate	

10 Heat networks	
Network name: Array	
Service provision	Space and water heating
Status	New heat network
Carbon dioxide emission factor for delivered heat	0.04 $kgCO_2/kWh$
Primary energy factor for delivered heat	0.39 kWh_{PE}/kWh

11 Supporting documentary evidence
N/A

12 Declarations	
a. Assessor Declaration	
This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report.	
Signed: Name:	Assessor ID: Date:
b. Client Declaration	
N/A	

DER WORKSHEET

Dwelling Reference: B411
Dwelling Type: New Dwelling Design Stage

B411
Hornsey park road
London
N8 0JY

1. Overall dwelling dimensions

	Area(m^2)		Av. Height(m)		Volume(m^3)	
Ground Floor	52.7	(1a) x	2.6	(2a) =	137.02	(3a)
Total floor area TFA					52.7	(4)
Dwelling volume					137.02	(5)

2. Ventilation Rate

Chimneys/Flues	0	x	80 =	0	(6a)
Open chimneys	0	x	20 =	0	(6b)
Chimneys / flues attached to closed fire	0	x	10 =	0	(6c)
Flues attached to solid fuel boiler	0	x	20 =	0	(6d)
Flues attached to other heater	0	x	35 =	0	(6e)
Number of blocked chimneys	0	x	20 =	0	(6f)
Number of intermittent extract fans	0	x	10 =	0	(7a)
Number of passive vents	0	x	10 =	0	(7b)
Number of flueless gas fires	0	x	40 =	0	(7c)

	Air changes per hour		
Number of storeys in the dwelling (ns)	0	0	(8)
Infiltration due to chimneys, flues, fans, PSVs, etc	0	0	(9)
Additional infiltration	0	0	(10)
Structural infiltration	0	0	(11)
Suspended wooden ground floor	0	0	(12)
No draught lobby	0	0	(13)
Percentage of windows and doors draught proofed	0	0	(14)
Window infiltration	0	0	(15)
Infiltration rate	0	0	(16)
Air permeability value, AP50, ($m^3/h/m^2$)	3	3	(17)
Air permeability value, AP4, ($m^3/h/m^2$)	0	0	(17a)
Air permeability value)	0.15	0.15	(18)
Number of sides on which dwelling is sheltered	3	3	(19)
Shelter factor		0.78	(20)

Infiltration rate incorporating shelter factor 0.12 (21)

Infiltration rate modified for monthly wind speed

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
Monthly average wind speed from Table U2														
	5.1	5	4.9	4.4	4.3	3.8	3.8	3.7	4	4.3	4.5	4.7	52.5	(22)
Wind Factor														
	1.28	1.25	1.23	1.1	1.08	0.95	0.95	0.93	1	1.08	1.13	1.18	13.13	(22a)
Adjusted infiltration rate (allowing for shelter and wind speed)														
	0.15	0.15	0.14	0.13	0.12	0.11	0.11	0.11	0.12	0.12	0.13	0.14	1.53	(22b)

Calculate effective air change rate for the applicable case:

0.5 (23a)

0.5 (23b)

81 (23c)

a) If balanced mechanical ventilation with heat recovery (MVHR)

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23		(24a)

b) If balanced mechanical ventilation without heat recovery (MV)

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

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

0	0	0	0	0	0	0	0	0	0	0	0	(24d)

Effective air change rate

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

Effective air change rate from PCDB:

0.24	0.24	0.24	0.22	0.22	0.21	0.21	0.2	0.21	0.22	0.23	0.23	(25)

3. Heat losses and heat loss parameter

Items in the table below are to be expanded as necessary to allow for all different types of element e.g. 4 wall types. The k -value

ELEMENT	A X U (W/K)	A X k kJ/K	
Doors	2.16		(26)
Windows	13.81		(27)
Roof window	0		(27a)
Basement floor	0	0	(28)
Ground floor	0	0	(28a)
Exposed floor	0	0	(28b)
Basement wall	0	0	(29)
External wall	14.19	1324.26	(29a)
Roof	5.27	474.3	(30)

Total area of external elements ∑A, m²		161.51	(31)
Party Wall	0	0	(32)
Party floor		2108	(32a)
Party ceiling		0	(32b)
Internal wall **		729	(33c)
Internal floor		0	(32d)
Internal ceiling floor		0	(32e)
Fabric heat loss, W/K = ∑ (A x U)		35.43	(33)
Heat capacity Cm = ∑(A x k)		4635.56	(34)
Thermal mass parameter (TMP = Cm ÷ TFA) in kJ/m²K		87.96	(35)
Linear Thermal bridges: ∑ (L x Ψ) calculated using Appendix K		8.1	(36)
Point Thermal bridges: ∑χ (W/K) if significant point thermal bridge present and values available		8.1	(36a)
Total fabric heat loss H = ∑(A × U) + ∑(L × Ψ) +∑χ		43.53	(37)

Ventilation heat loss calculated monthly

11	10.87	10.73	10.08	9.95	9.29	9.29	9.16	9.55	9.95	10.21	10.47		(38)

Heat transfer coefficient, W/K

54.53	54.39	54.26	53.61	53.47	52.82	52.82	52.69	53.08	53.47	53.74	54		(39)

Heat loss parameter (HLP), W/m²K

1.03	1.03	1.03	1.02	1.01	1	1	1	1.01	1.01	1.02	1.02		(40)

Number of days in month (Table 1a)

31	28	31	30	31	30	31	31	30	31	30	31		(41)

4. Water heating energy requirement

Assumed occupancy, N 1.77 (42)

Hot water usage in litres per day for mixer showers, Vd,shower (from Appendix J)

53.89	53.08	51.9	49.64	47.98	46.12	45.06	46.23	47.52	49.51	51.82	53.69		(42a)

Hot water usage in litres per day for baths, Vd,bath (from Appendix J)

23.3	22.95	22.47	21.57	20.89	20.15	19.75	20.23	20.76	21.55	22.47	23.22		(42b)

Hot water usage in litres per day for other uses, Vd,other (from Appendix J)

32.75	31.56	30.37	29.18	27.99	26.8	26.8	27.99	29.18	30.37	31.56	32.75		(42c)

Annual average hot water usage in litres per day Vd,average (from Appendix J) 101.21 (43)

Hot water usage in litres per day for each month Vd,m = (42a) + (42b) + (42c)

109.94	107.6	104.74	100.39	96.86	93.07	91.61	94.45	97.45	101.44	105.85	109.66	1213.06	(44)

Energy content of hot water used = 4.18 x Vd,m x nm x DTm / 3600 kWh/month (from Appendix J)

174.12	153.22	160.98	137.43	130.39	114.44	110.79	116.95	120.17	137.65	150.81	171.7	1678.65	(45)

Distribution loss (46) = 0.15 x (45)

26.12	22.98	24.15	20.61	19.56	17.17	16.62	17.54	18.03	20.65	22.62	25.75		(46)

Storage volume (litres) including any solar or WWHRS storage within same vessel 0 (47)

Water storage loss (or HIU loss)

a) If manufacturer's declared loss factor is known (kWh/day): 1.4 (48)

Temperature factor from Table 2b 0.6 (49)

Energy lost from water storage, kWh/day (48) x (49) = 0.84 (50)

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

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/day 0 (54)

Enter (50) or (54) in (55) 0.84 (55)

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

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (56)

If the vessel contains dedicated solar storage or dedicated WWHRS storage,

(57)m = (56)m [(47) – Vs] ÷ (47), else (57)m = (56)m

where Vs is Vww from Appendix G3 or (H12) from Appendix H (as applicable).

26.04 23.52 26.04 25.2 26.04 25.2 26.04 26.04 25.2 26.04 25.2 26.04 (57)

Primary circuit loss for each month from Table 3

modified by factor from Table H4 if there is solar water heating and a cylinder thermostat, although not for DHW-only heat networks)

23.26 21.01 23.26 22.51 23.26 22.51 23.26 23.26 22.51 23.26 22.51 23.26 (59)

Combi loss for each month from Table 3a, 3b or 3c (enter 0 if not a combi boiler)

0 0 0 0 0 0 0 0 0 0 0 0 (61)

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

223.43 197.75 210.28 185.14 179.7 162.15 160.09 166.25 167.88 186.95 198.52 221 2259.15 (62)

CWWHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no WWHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63a)

PV diverter DHW input calculated using Appendix G (negative quantity) (enter 0 if no PV diverter contribution)

0 0 0 0 0 0 0 0 0 0 0 0 (63b)

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

0 0 0 0 0 0 0 0 0 0 0 0 (63c)

FGHRS DHW input calculated using Appendix G (negative quantity) (enter 0 if no FGHRS contribution to water heating)

0 0 0 0 0 0 0 0 0 0 0 0 (63d)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

223.43 197.75 210.28 185.14 179.7 162.15 160.09 166.25 167.88 186.95 198.52 221 2259.15 (64)

Output from water heater for each month, kWh/month (64) = (62) + (63a) + (63b) + (63c) + (63d)

0 0 0 0 0 0 0 0 0 0 0 0 (64a)

Heat gains from water heating, kWh/month 0.25 x [0.85 × (45) + (61) + (64a)] + 0.8 x [(46) + (57) + (59)]

97.34 86.57 92.97 83.87 82.8 76.22 76.28 78.33 78.13 85.21 88.31 96.53 (65)

include (57) m in calculation of (65) m only if hot water store is in the dwelling or hot water is from heat network

5. Internal gains (see Tables 5 and 5a)

Metabolic gains (Table 5), watts

88.49 88.49 88.49 88.49 88.49 88.49 88.49 88.49 88.49 88.49 88.49 88.49 (66)

Lighting gains (calculated in Appendix L, equation L12 or L12a), also see Table 5

77.8	86.13	77.8	80.39	77.8	80.39	77.8	77.8	80.39	77.8	80.39	77.8	(67)

Appliances gains (calculated in Appendix L, equation L16 or L16a), also see Table 5

154.24	155.84	151.81	143.22	132.38	122.2	115.39	113.79	117.82	126.41	137.25	147.44	(68)

Cooking gains (calculated in Appendix L, equation L18 or L18a), also see Table 5

31.85	31.85	31.85	31.85	31.85	31.85	31.85	31.85	31.85	31.85	31.85	31.85	(69)

Pumps and fans gains (Table 5a)

0	0	0	0	0	0	0	0	0	0	0	0	(70)

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

-70.79	-70.79	-70.79	-70.79	-70.79	-70.79	-70.79	-70.79	-70.79	-70.79	-70.79	-70.79	(71)

Water heating gains (Table 5)

130.83	128.82	124.96	116.48	111.29	105.86	102.53	105.28	108.51	114.53	122.66	129.75	(72)

Total internal gains

412.41	420.34	404.11	389.64	371.01	357.99	345.26	346.41	356.27	368.28	389.84	404.52	(73)

6. Solar gains

Solar gains in watts, calculated for each month

34.72	67.01	112.36	173.5	225.35	237.29	223.13	182.42	133.24	79.66	43.02	28.78	(83)

Total gains – internal and solar (watts)

447.13	487.35	516.47	563.14	596.36	595.28	568.39	528.84	489.51	447.94	432.86	433.3	(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, ⍰1,m (see Table 9a)

0.91	0.89	0.85	0.77	0.65	0.5	0.38	0.42	0.61	0.8	0.88	0.92	(86)

Mean internal temperature in living area T1 (follow steps 3 and 4 in Table 9c)

18.81	19.07	19.48	20.06	20.53	20.83	20.94	20.92	20.71	20.12	19.4	18.77	(87)

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

20.05	20.06	20.06	20.07	20.07	20.08	20.08	20.08	20.08	20.07	20.07	20.06	(88)

Roof

Utilisation factor for gains for rest of dwelling, ⍰2,m (see Table 9a)

0.9	0.88	0.83	0.74	0.61	0.45	0.31	0.35	0.56	0.77	0.87	0.91	(89)

Roof

Mean internal temperature in the rest of dwelling T2

18.07	18.32	18.73	19.28	19.71	19.97	20.05	20.04	19.88	19.35	18.65	18.03	(90)

Living area fraction 0.41 (91)

Mean internal temperature (for the whole dwelling)

18.37	18.63	19.03	19.6	20.04	20.32	20.41	20.4	20.22	19.67	18.96	18.33	(92)

Adjusted mean internal temperature:

18.37	18.63	19.03	19.6	20.04	20.32	20.41	20.4	20.22	19.67	18.96	18.33	(93)

8. Space heating requirement

Utilisation factor for gains,

0.88	0.85	0.81	0.73	0.61	0.46	0.34	0.38	0.56	0.75	0.84	0.89	(94)

Useful gains, mGm , W

392.76	415.36	419.09	410.45	364.86	274.87	192.72	199.11	276.4	336.21	365.18	383.55	(95)

Monthly average external temperature from Table U1

4.3	4.9	6.5	8.9	11.7	14.6	16.6	16.4	14.1	10.6	7.1	4.2	(96)

Heat loss rate for mean internal temperature

767.09	746.6	680.17	573.48	446.22	302.36	201.47	210.82	324.64	484.82	637.2	763.24	(97)

Space heating requirement for each month

278.5	222.6	194.24	117.38	60.54	0	0	0	0	110.56	195.86	282.49	(98a)

Solar space heating calculated using Appendix H (negative quantity)

0	0	0	0	0	0	0	0	0	0	0	0	(98b)

Space heating requirement for each month after solar contribution

278.5	222.6	194.24	117.38	60.54	0	0	0	0	110.56	195.86	282.49	(98c)

Space heating requirement in kWh/m²/year 27.74 (99)

8c. Space Cooling requirement

Heat loss rate,

0	0	0	0	0	0	0	0	0	0	0	0	(100)

Utilisation factor for loss

0	0	0	0	0	0	0	0	0	0	0	0	(101)

Useful loss, mLm (watts)

0	0	0	0	0	0	0	0	0	0	0	0	(102)

Gains

0	0	0	0	0	0	0	0	0	0	0	0	(103)

Space cooling requirement for month, whole dwelling, continuous (kWh) (104)

0	0	0	0	0	0	0	0	0	0	0	0	(104)

Cooled fraction 0 (105)

Intermittency factor

0	0	0	0	0	0	0	0	0	0	0	0	(106)

Space cooling requirement for month 0 0

0	0	0	0	0	0	0	0	0	0	0	0	(107)

Space cooling requirement in kWh/m²/year 0 (108)

8f. Space heating requirement

Fabric Energy Efficiency, 0 0 (109)

9b. Energy requirements – Heat networks

Fraction Of space heat from secondary/supplementary heating	0	(301)
Fraction Of space heat from heat network	1	(302)
Where the heat network Is Not listed In the PCDB:	0	
Fraction of heat from CHP	1	(303a)
Fraction of heat from heat source 2	0	(303b)
Fraction of heat from heat source 3	0	(303c)
Fraction of heat from heat source 4	0	(303d)
Fraction of heat from heat source 5	0	(303e)
Whether the heat network is listed in the PCDB or not:	0	
Factor for control and charging method (Table 4c(3)) for space heating	1.05	(305)
Factor for charging method (Table 4c(3)) for water heating	1	(305a)
Distribution loss factor (Table 12c) for heat network - set to 1 if HN listed in PCDB	1	(306)
Annual space heating requirement		
Heat required from heat network		
Where the heat network is not listed in the PCDB:		
Space heat from CHP	1535.27	(307a)
Space heat from heat source 2	0	(307b)
Space heat from heat source 3	0	(307c)
Space heat from heat source 4	0	(307d)
Space heat from heat source 5	0	(307e)
Whether the heat network is listed in the PCDB or not:		(302)
Efficiency of secondary/supplementary heating system in %	0	(308)
Space heating fuel for secondary/supplementary system	0	(309)
Water heating		
Annual water heating requirement		
If DHW from heat network:		
Heat required from heat network	0	(310)
Where the heat network is not listed in the PCDB:		
Water heat from CHP	2259.15	(310a)
Water heat from heat source 2	0	(310b)
Water heat from heat source 3	0	(310c)
Water heat from heat source 4	0	(310d)
Water heat from heat source 5	0	(310e)
If DHW by immersion or instantaneous heater within dwelling:		
Efficiency of water heater	0	(311)
Water heated by immersion or instantaneous heater	0	(312)
Electricity used for instantaneous electric shower(s)	0	(312a)
Electrical pumping energy as proportion of heat supplied	0	(313a)
Electricity used for heat distribution	37.94	(313)
Cooling System Seasonal Energy Efficiency Ratio	0	(314)
Space cooling (if there is a fixed cooling system	0	(315)
Electricity for pumps and fans within dwelling		

mechanical ventilation - balanced, extract or positive input from outside												112.84	(330a)
warm air heating system fans												0	(330b)
pump for solar water heating												0	(330g)
pump for storage WWHRS (see section G3.3)												0	(330h)
electricity use by heat interface unit												0	(330i)
Total electricity for pumps and fans												112.84	(331)
Electricity for lighting (calculated in Appendix L)												130.46	(332)
Energy generation (Appendixs M, negative quantity) - Energy used in dwelling													
PV	8.11	13.79	24.2	32.23	38.58	37.42	36.71	32.45	25.53	17.47	9.56	6.67	282.72 (333a)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334a)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335a)
Energy generation (Appendixs M, negative quantity) - Energy used exported													
PV	1.95	5.08	12.94	23.93	35.7	37.46	36.41	28.29	17.53	8.06	2.79	1.45	211.6 (333b)
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0 (334b)
Hydro	0	0	0	0	0	0	0	0	0	0	0	0	0 (335b)
Appendix Q items: annual energy													0
energy saved													0 (336b)
energy used													0 (337b)
Total delivered energy for all uses													4037.71

10b. Fuel costs – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB:				
Fuel required	kWh/year	Fuel price	Fuel cost £/year	
Space heating from CHP	0		68.17	(340a)
Space heating from heat source 2	0		0	(340b)
Space heating from heat source 3	0		0	(340c)
Space heating from heat source 4	0		0	(340d)
Space heating from heat source 5	0		0	(340e)
Where the heat network is not listed in the PCDB:				
Space heating from PCDB heat network	0		4.44	(340)
Space heating fuel for secondary/supplementary system	0		0	(341)
If DHW from heat network:				
Where the heat network Is Not listed in the PCDB:				
Water heating from CHP	0		100.31	(342a)
Water heating from heat source 2	0		0	(342b)
Water heating from heat source 3	0		0	(342c)
Water heating from heat source 4	0		0	(342d)
Water heating from heat source 5	0		0	(342e)
Water heating from PCDB heat network			4.44	(342)
If water heated by immersion heater:				
High-rate fraction (Table 13)	0		0	(343)

Low-rate fraction	0	0	(344)
High-rate cost, or cost for single immersion	0	0	(345)
Low-rate cost	0	0	(346)
If water heated by instantaneous water heater	0	0	(347)
Energy used by instantaneous electric shower(s)	0	0	(347a)
Space cooling	0	0	(348)
Pumps and fans	0	18.61	(349)
Electricity for lighting	0	21.51	(350)
Additional standing charges (Table 12)		92	(351)
energy saved or generated		-58.45	
energy saved	0	0	(353)
energy used	0	0	(354)
Total energy cost	0	242.14	(355)

11b. SAP SAP rating – Heat networks

Energy cost deflator	0.36	(356)
Energy cost factor (ECF)	0.89	(357)
SAP rating	85.54	(358)

12b. CO2 emissions – Individual heating systems

Where the heat network is not listed in the PCDB

CO2 from CHP (space and water heating):

Power efficiency of CHP unit (e.g. 25%)	0	(361)
Heat efficiency of CHP unit (e.g. 50%)	0	(362)

	Energy KWh/year	Emission factor kg	Emissions kg CO2/year	
Space heating from CHP			0	(363)
less credit emissions for electricity			0	(364)
Water heated by CHP			0	(365)
less credit emissions for electricity			0	(366)

CO2 from other sources of space and water heating (not CHP):

Efficiency of heat source 2 (%)	0	(367b)
Efficiency of heat source 3 (%)	0	(367c)
Efficiency of heat source 4 (%)	0	(367d)
Efficiency of heat source 5 (%)	0	(367e)
CO2 associated with heat source 2	0	(368)
CO2 associated with heat source 3	0	(369)
CO2 associated with heat source 4	0	(370)
CO2 associated with heat source 5	0	(371)

Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
Where the heat network is listed in the PCDB:	Energy used KWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Electrical energy for heat distribution			5.56	(372)
Total CO2 associated with heat networks			134.57	(373)
Space heating (secondary)			0	(374)
Water heating by immersion heater or instantaneous heater			0	(375)
Energy used by instantaneous electric shower(s)			0	(375a)
Total CO2 associated with space and water heating			134.57	(376)
Space cooling			0	(377)
Electricity for pumps and fans within dwelling			15.65	(378)
Electricity for lighting			18.83	(379)
energy saved or generated				
energy saved or generated			System.Double[]	(380)
Appendix Q items				
energy saved			0	(381)
energy used			0	(382)
energy used			106.26	(383)
Total CO2, kg/year			2.02	(384)
EI rating (section 14)			98.54	(385)
Overall CO2 factor for heat network			0.04	(386)

13b. Primary Energy – Individual heating systems including micro-CHP

Where the heat network is not listed in the PCDB				
CO2 from CHP (space and water heating):				
Power efficiency of CHP unit (e.g. 25%)			0	(461)
Heat efficiency of CHP unit (e.g. 50%)			0	(462)
	Energy kWh/year	Emission factor from table 12	CO2/yearr kgCO2/year	
Space heating from CHP			0	(463)
less credit emissions for electricity			0	(464)
Water heated by CHP			0	(465)
less credit emissions for electricity			0	(466)
CO2 from other sources of space and water heating (not CHP):				
Efficiency of heat source 2 (%)			0	(467b)
Efficiency of heat source 3 (%)			0	(467c)
Efficiency of heat source 4 (%)			0	(467d)
Efficiency of heat source 5 (%)			0	(467e)

CO2 associated with heat source 2			0	(468)
CO2 associated with heat source 3			0	(469)
CO2 associated with heat source 4			0	(470)
CO2 associated with heat source 5			0	(471)
Where the heat network is listed in the PCDB:	Energy used kWh/year	Emission factor from PCDB	CO2/year kgCO2/year	
Space and water heating supplied by heat network			0	(371a)
	Energy kWh/year	Emission factor from Table 12	CO2/year kgCO2/year	
Electrical energy for heat distribution			58.5	(472)
Total CO2 associated with heat networks			1482.35	(473)
Space heating (secondary)			0	(474)
Water heating by immersion heater or instantaneous heater			0	(475)
Energy used by instantaneous electric shower(s)			0	(475a)
Total CO2 associated with space and water heating			1482.35	(476)
Space cooling			0	(477)
Electricity for pumps and fans within dwelling			170.7	(478)
Electricity for lighting			200.1	(479)
energy saved or generated				
energy saved or generated	0		-514.01	(480)
Appendix Q items				
energy saved	0		0	(481)
energy used			0	(482)
Total CO2, kg/year			1339.14	(383)
Dwelling CO2 Emission Rate			25.41	(274)
Overall CO2 factor for heat network			0.39	(386)

Predicted Energy Assessment

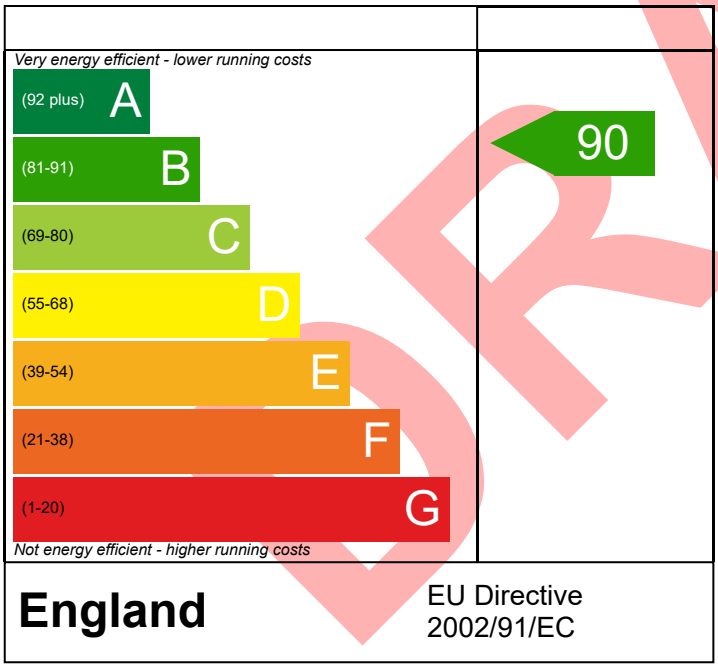
Hornsey park road, A01, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	92.2 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

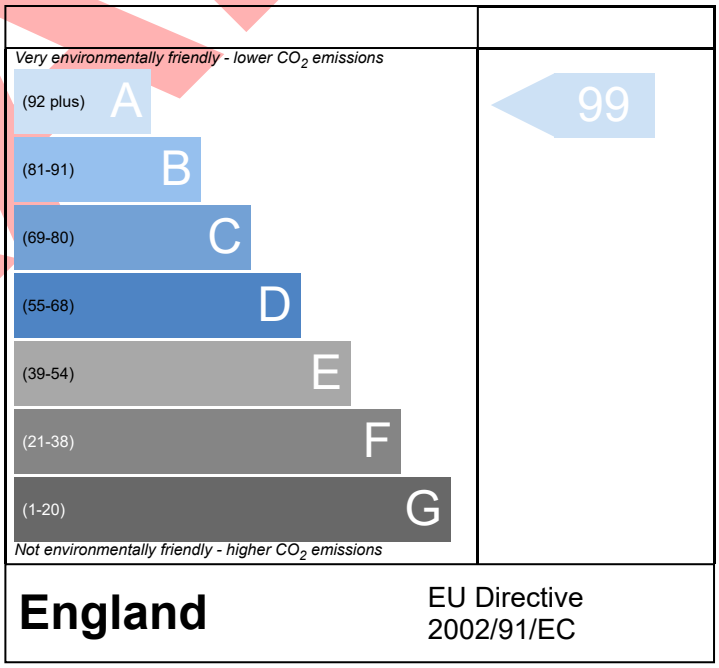
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



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Environmental Impact (CO_2) Rating



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Predicted Energy Assessment

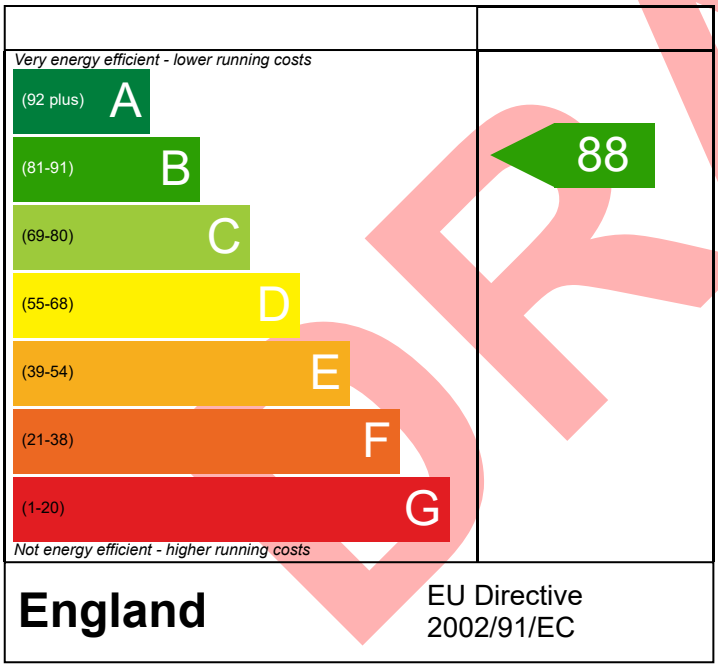
Hornsey park road, A02, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	73.4 m²
DRRN:	

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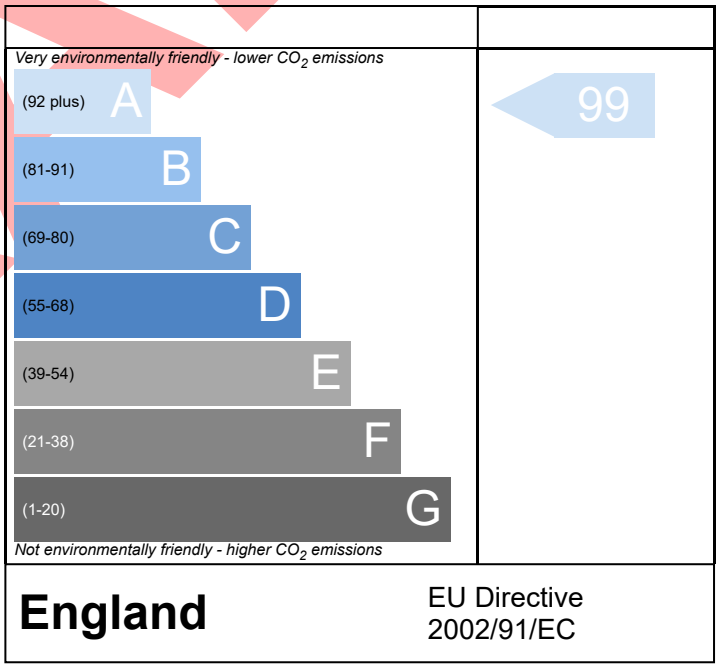
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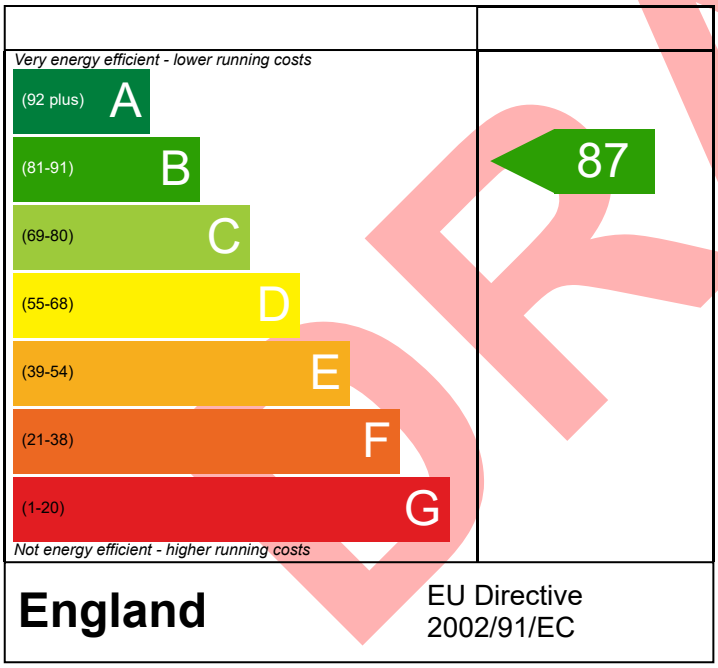
Hornsey park road, A03, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	58.8 m²
DRRN:	

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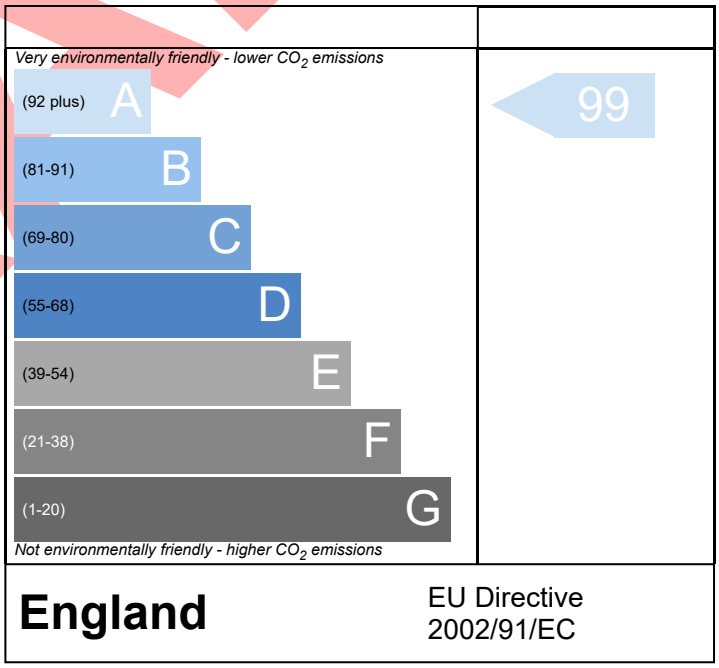
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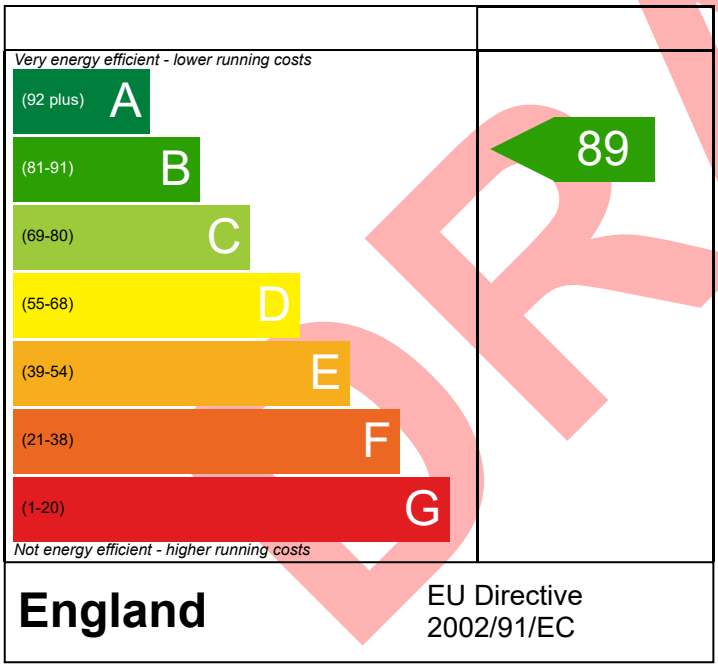
Hornsey park road, A14, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	50.9 m²
DRRN:	

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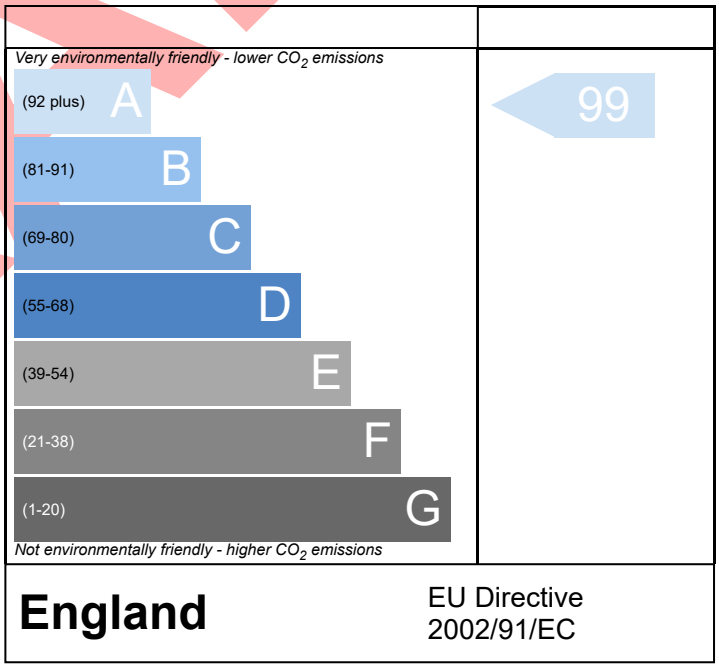
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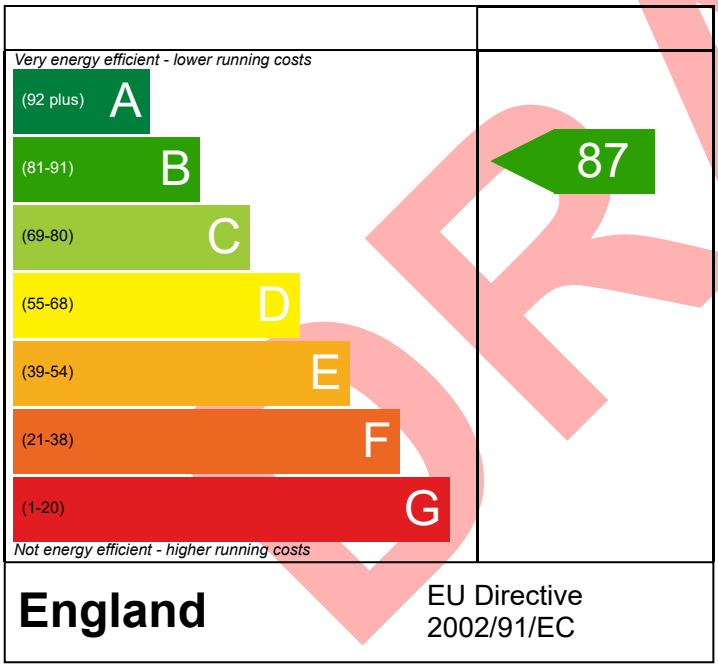
Hornsey park road, A15, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	41.6 m²
DRRN:	

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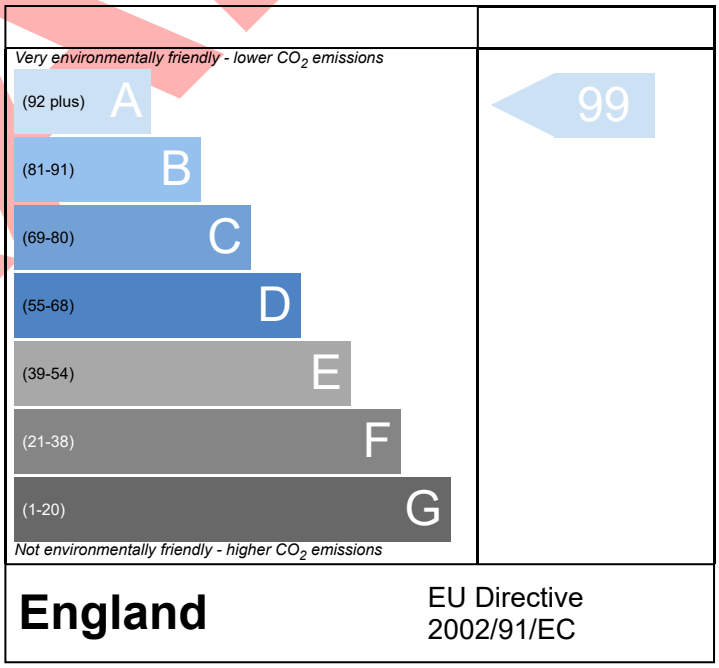
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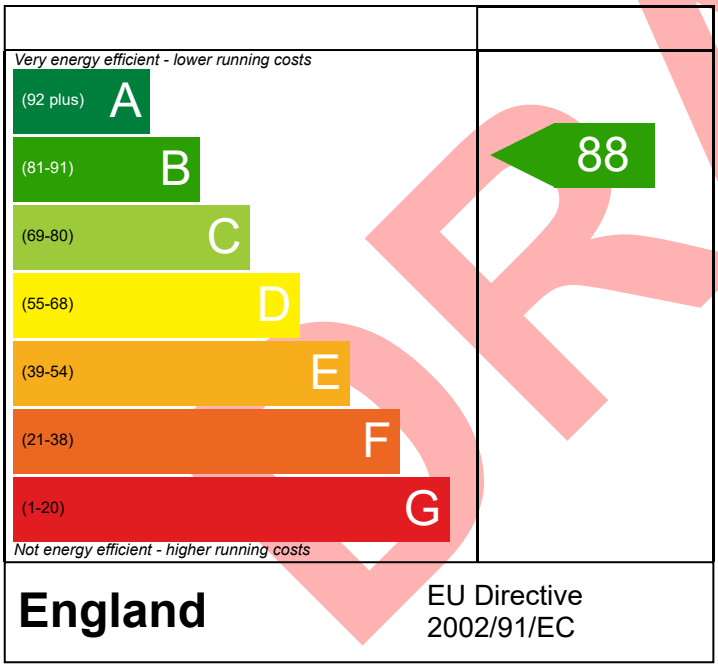
Hornsey park road, A16, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	73.4 m²
DRRN:	

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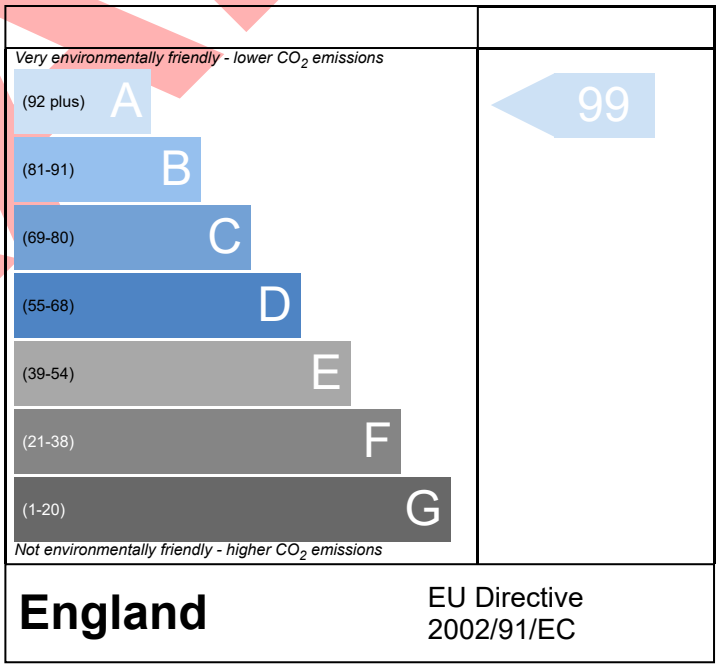
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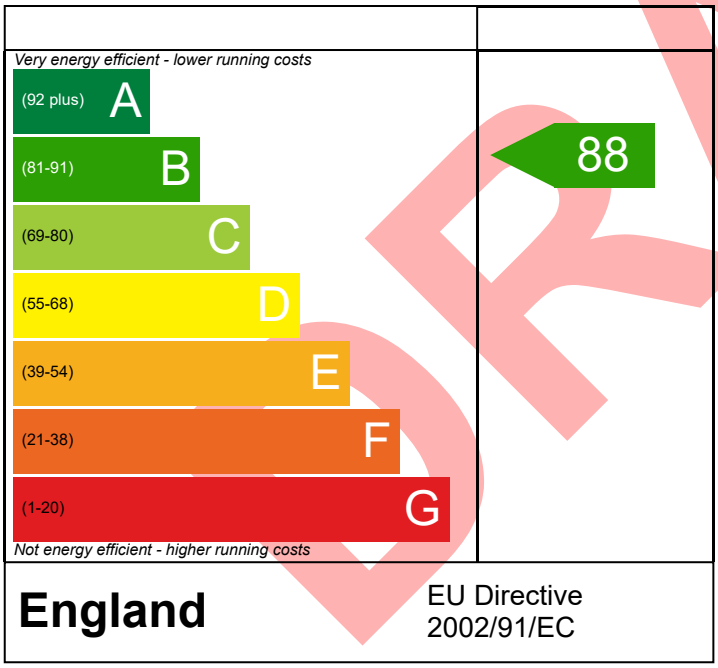
Hornsey park road, A17, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	58.8 m²
DRRN:	

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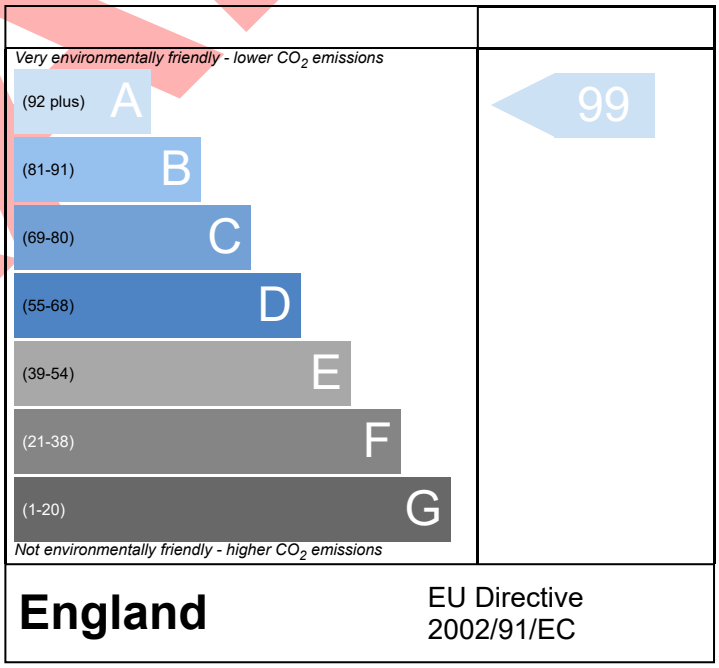
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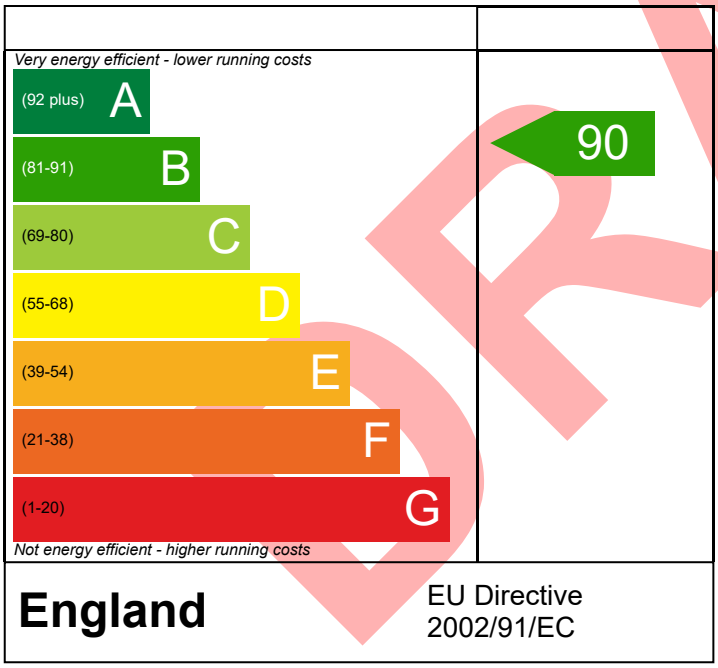
Hornsey park road, A28, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	50.9 m²
DRRN:	

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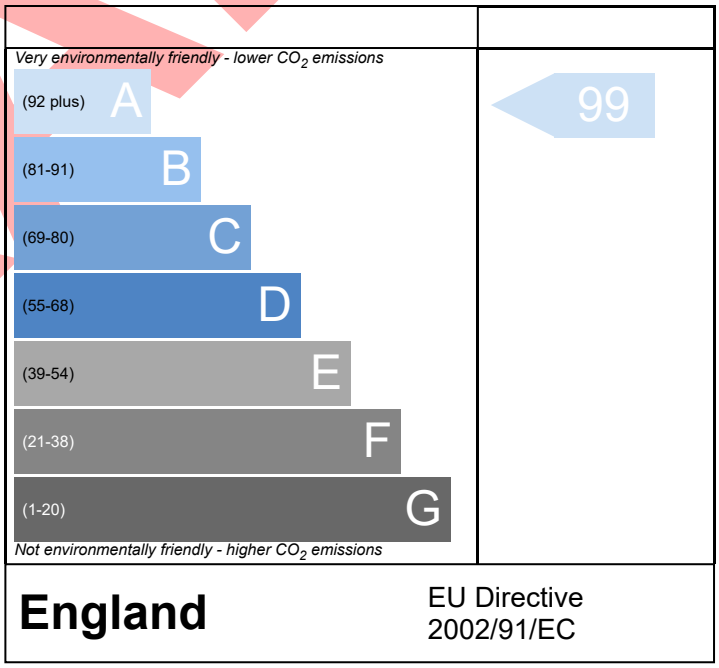
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Predicted Energy Assessment

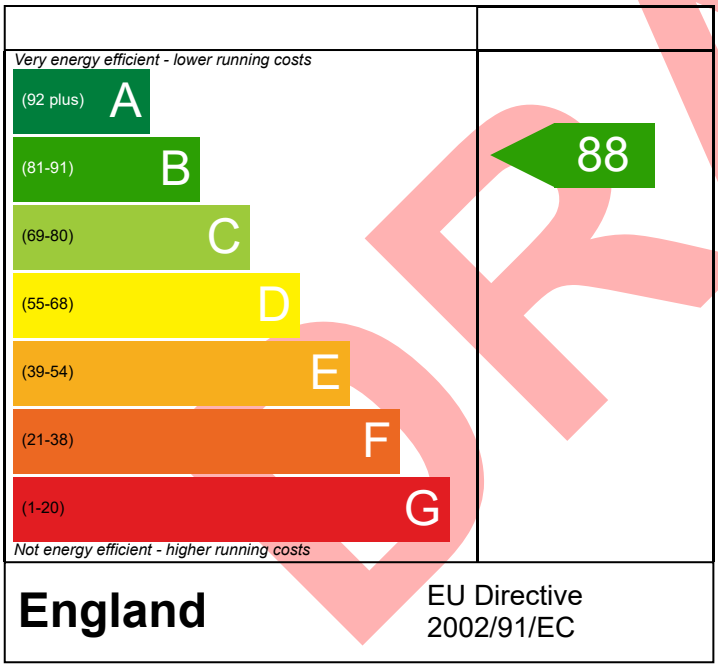
Hornsey park road, A29, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	41.6 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

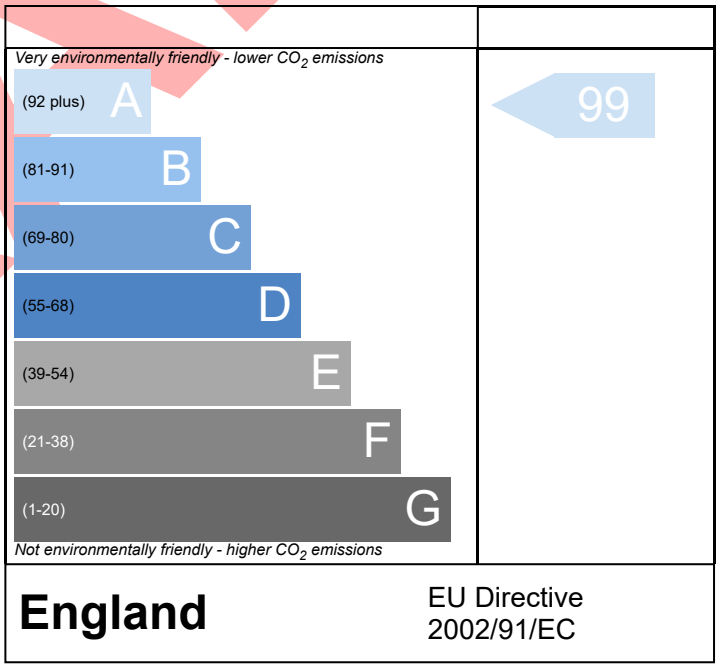
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency 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.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

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Predicted Energy Assessment

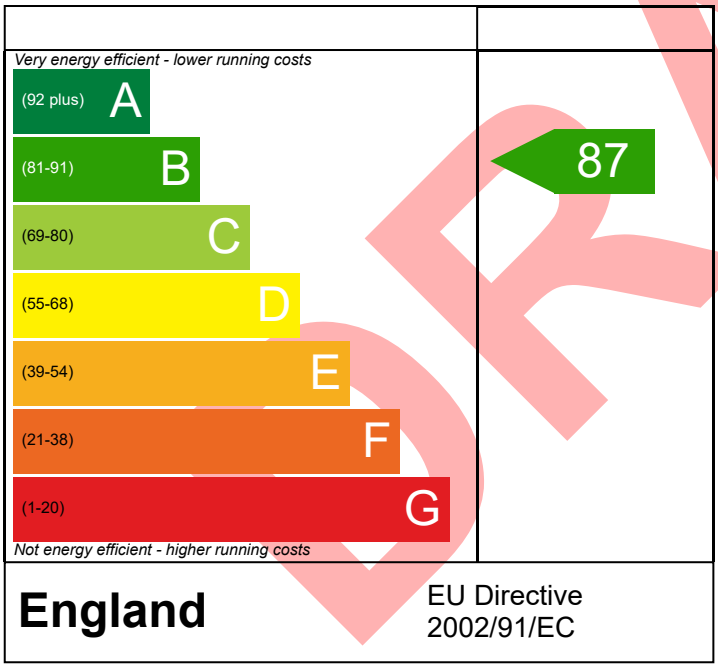
Hornsey park road, A210, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	73.4 m²
DRRN:	

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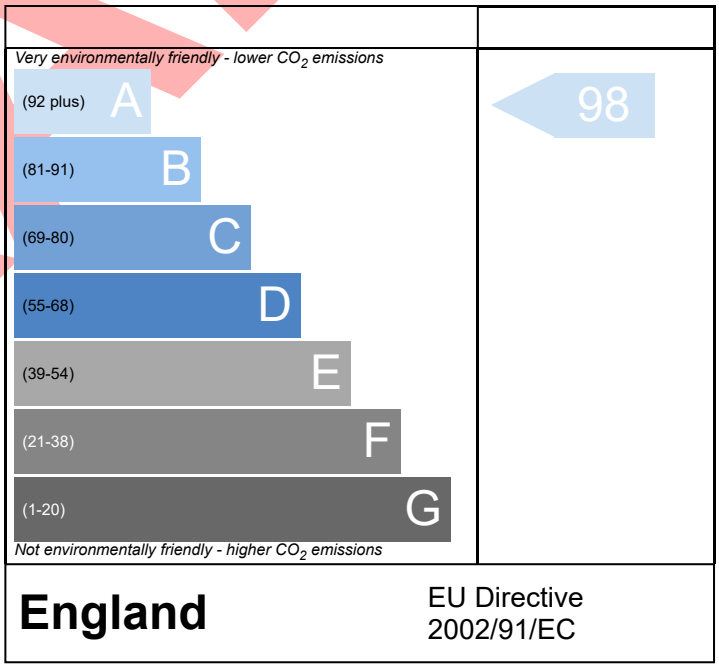
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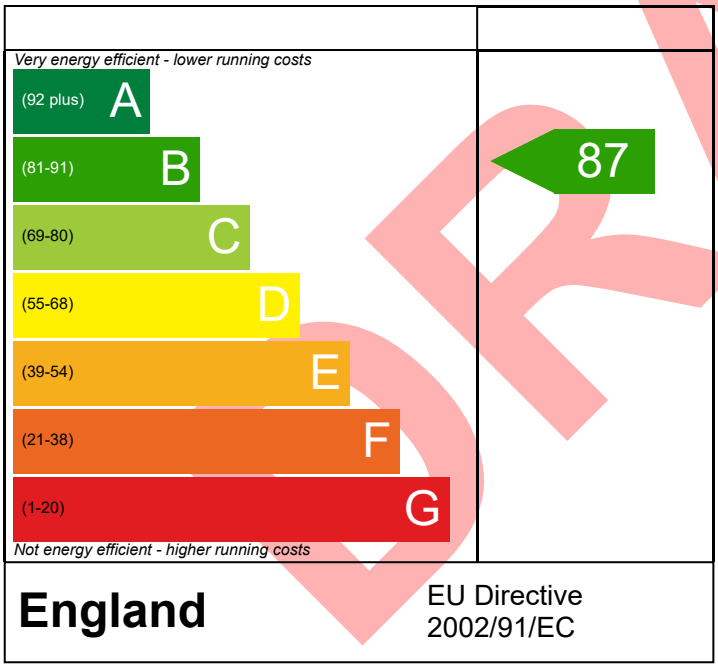
Hornsey park road, A211, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	58.8 m²
DRRN:	

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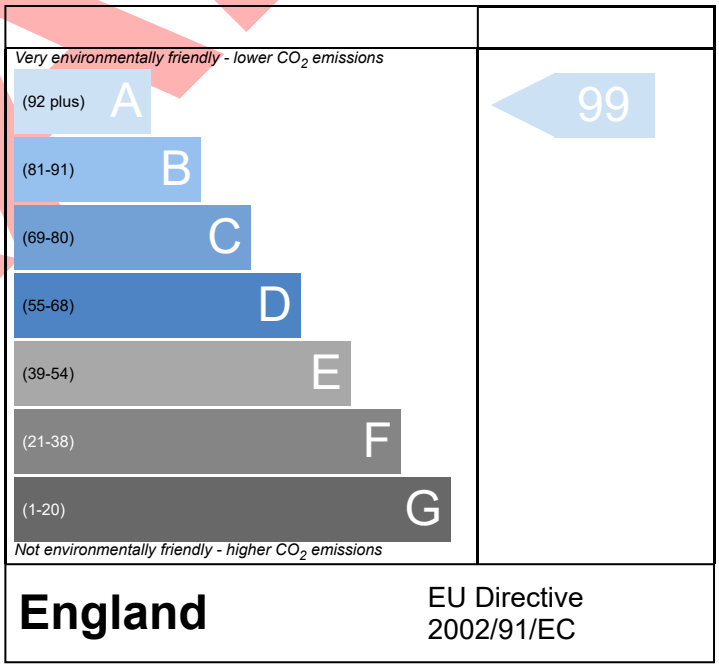
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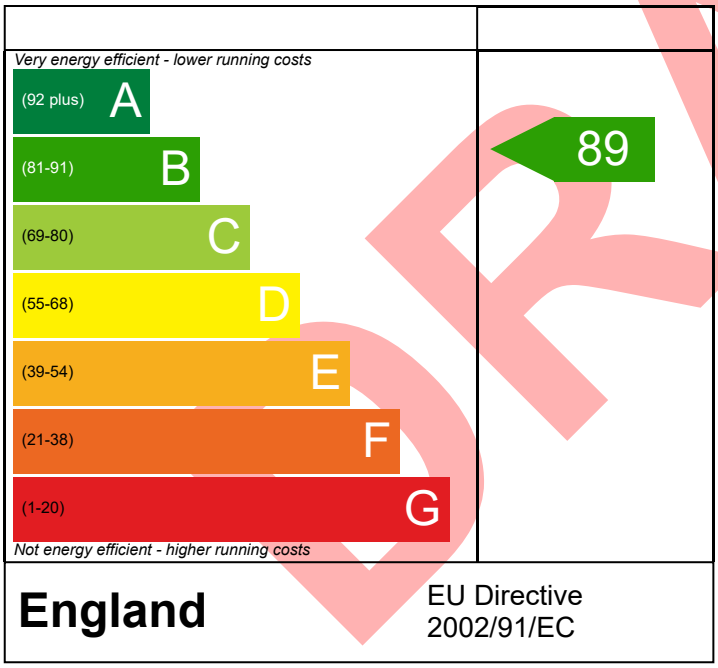
Hornsey park road, A312, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	50.9 m²
DRRN:	

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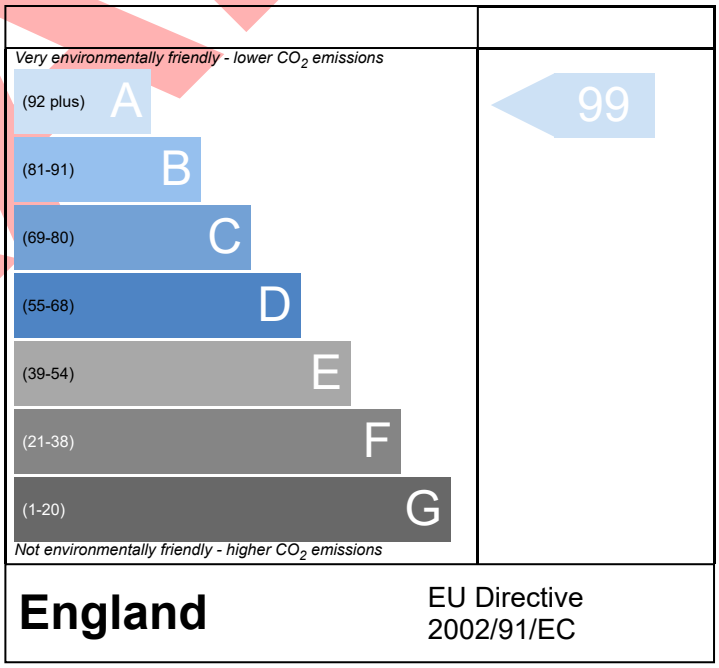
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Environmental Impact (CO_2) Rating



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Predicted Energy Assessment

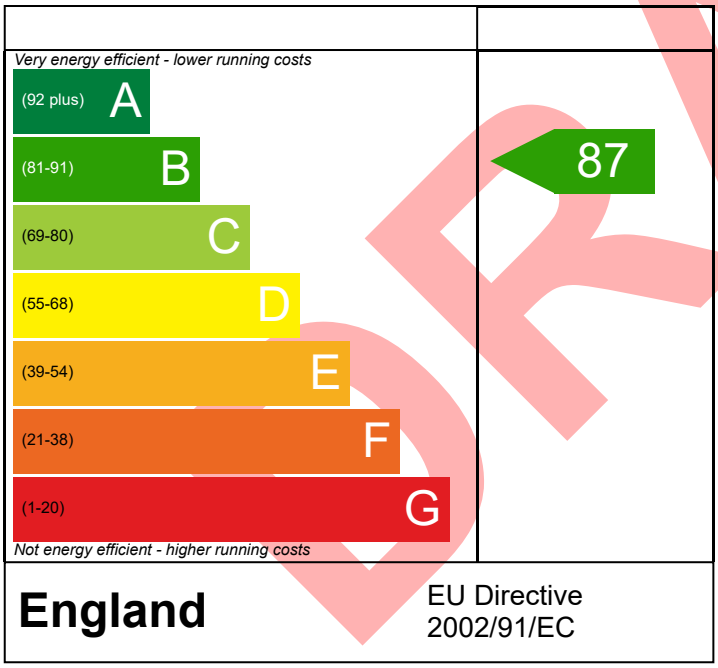
Hornsey park road, A313, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	41.6 m²
DRRN:	

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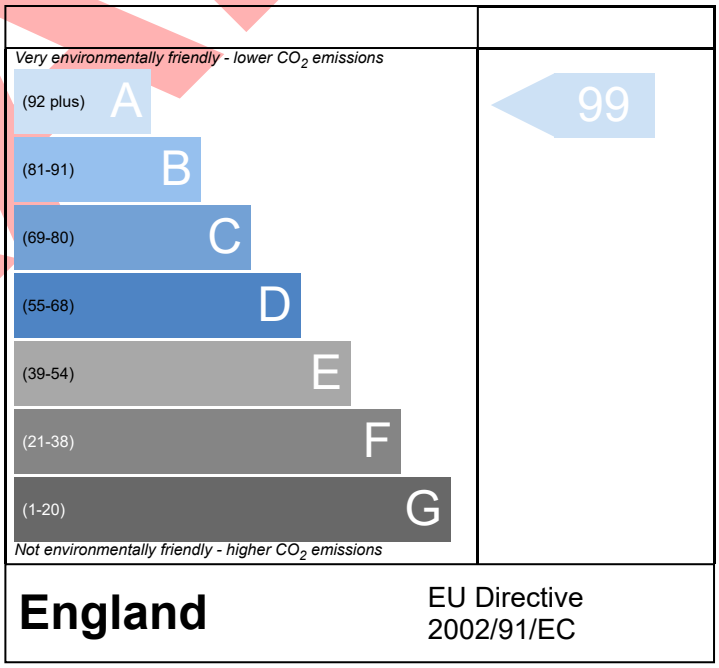
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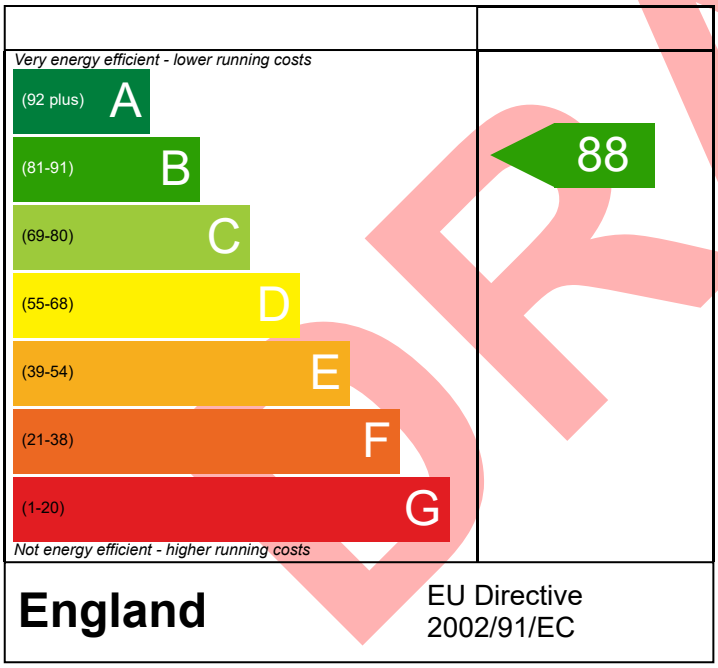
Hornsey park road, A314, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	73.4 m²
DRRN:	

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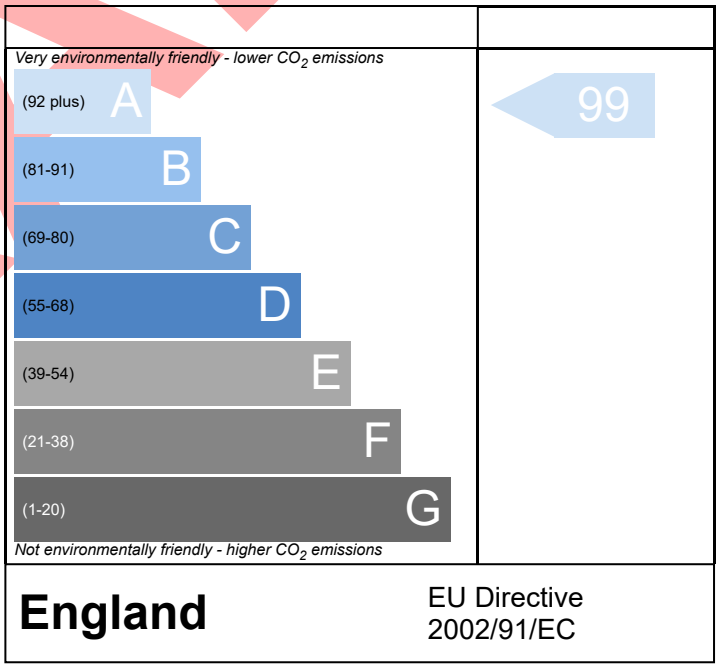
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Predicted Energy Assessment

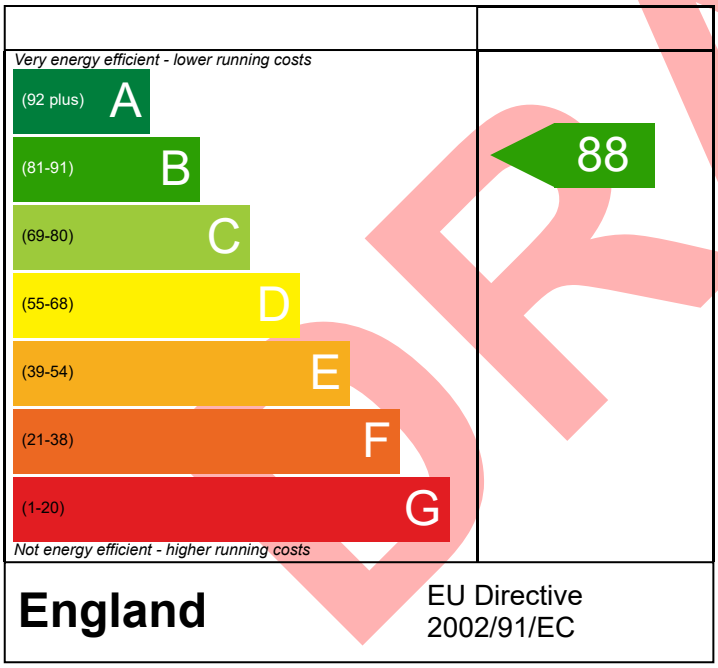
Hornsey park road, A315, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	58.8 m²
DRRN:	

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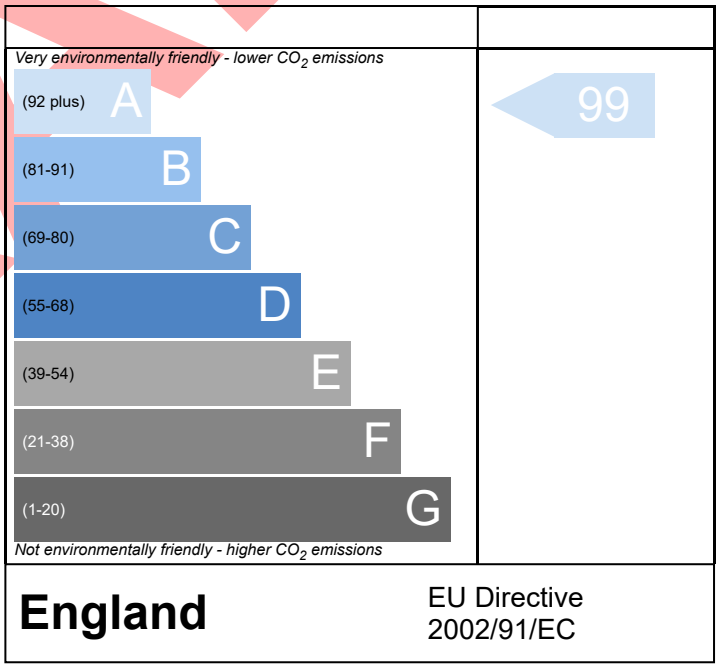
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Predicted Energy Assessment

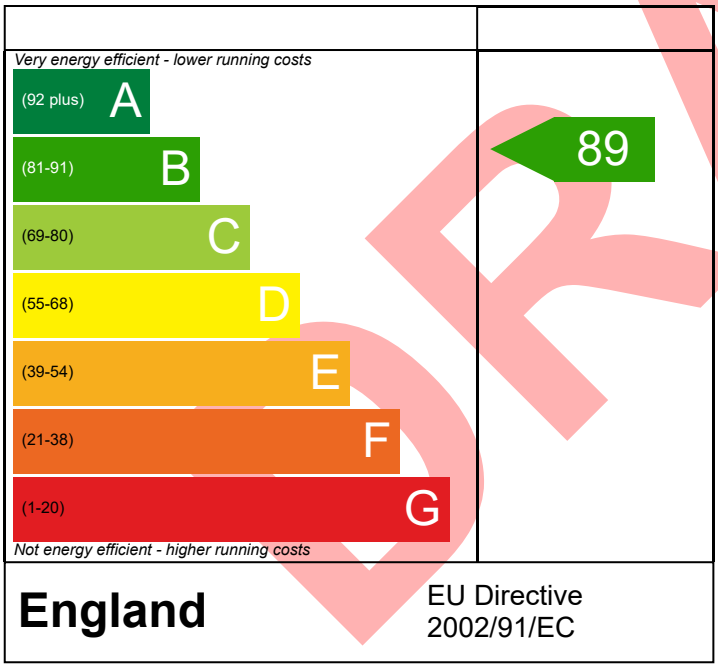
Hornsey park road, A416, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	56.2 m²
DRRN:	

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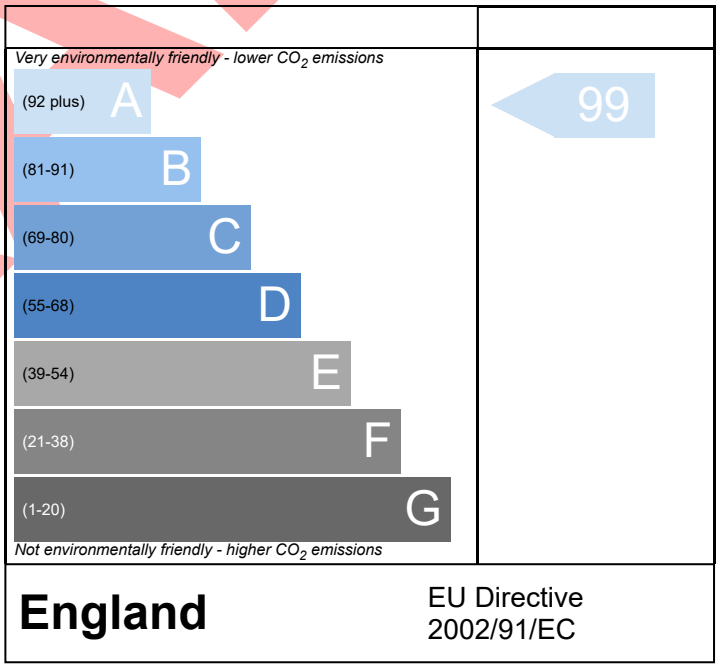
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Predicted Energy Assessment

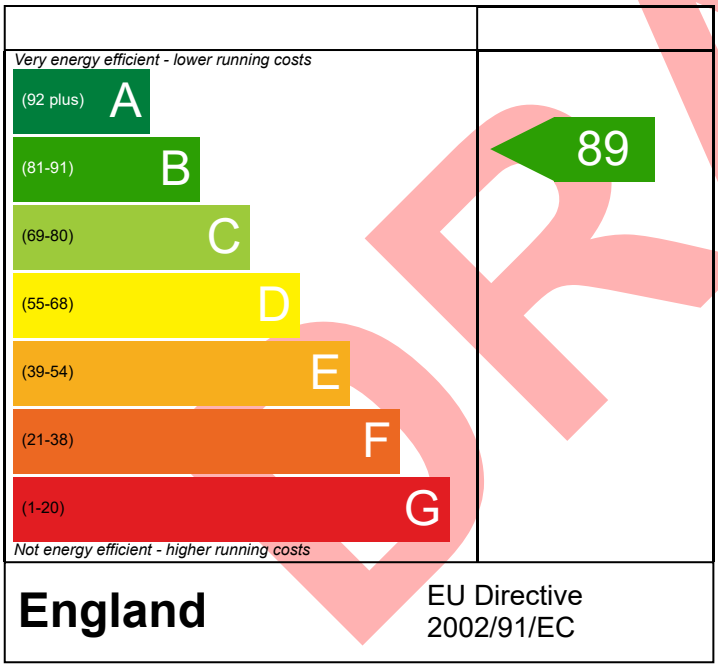
Hornsey park road, A417, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	73.4 m²
DRRN:	

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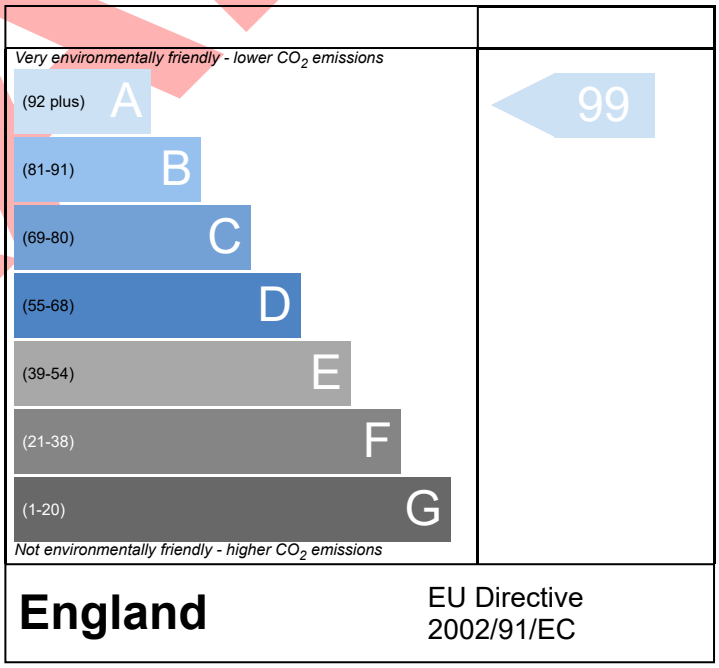
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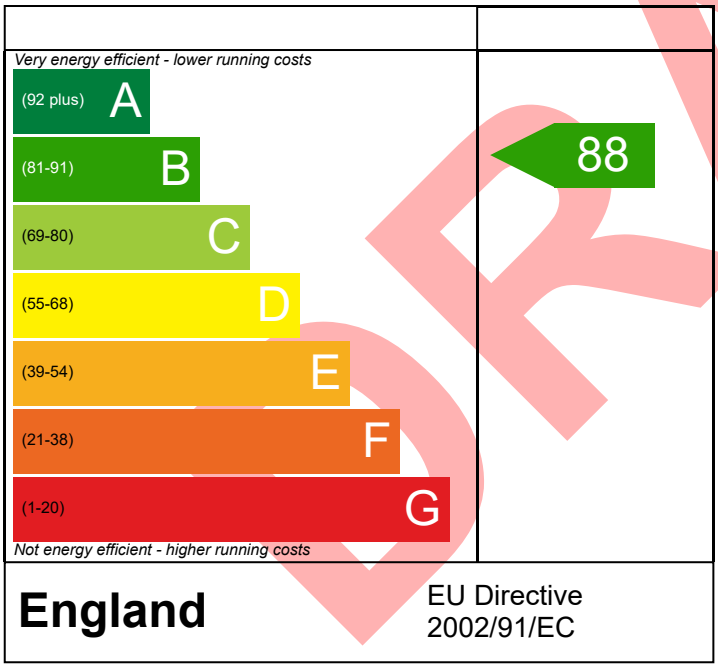
Hornsey park road, A418, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	58.8 m²
DRRN:	

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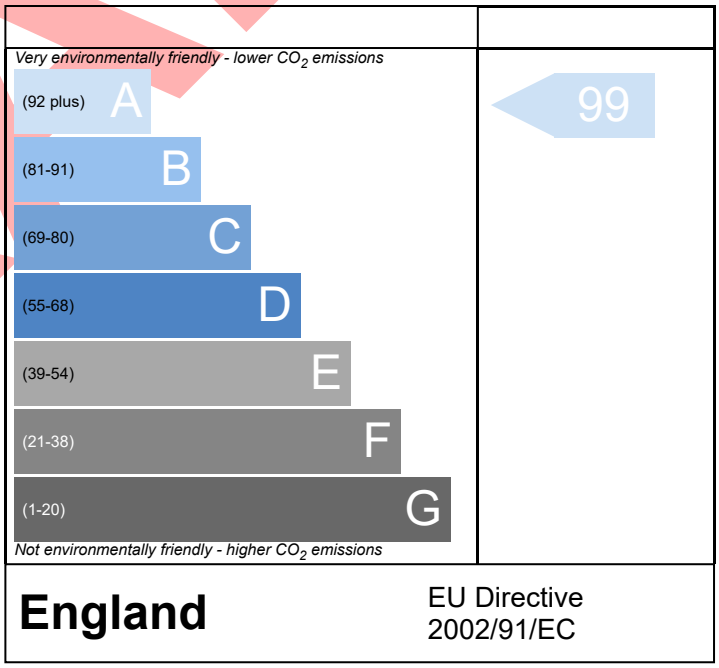
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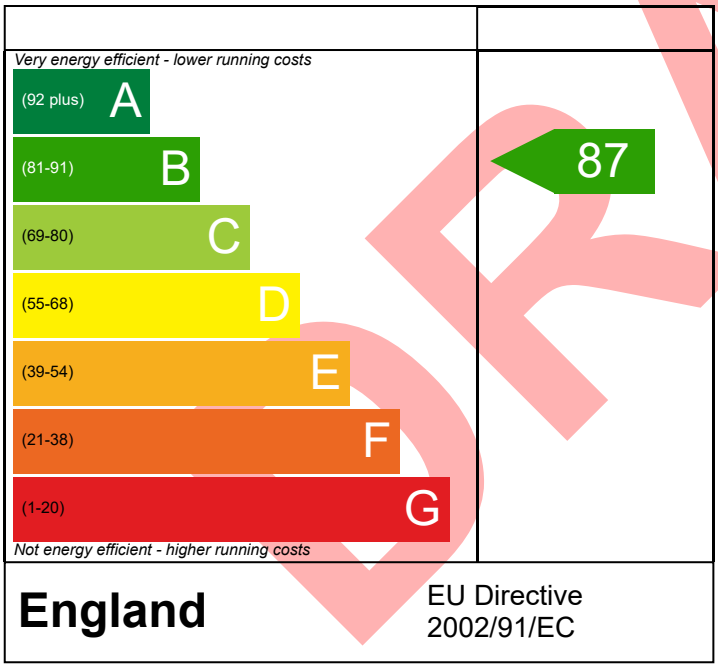
Hornsey park road, A519, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	56.2 m²
DRRN:	

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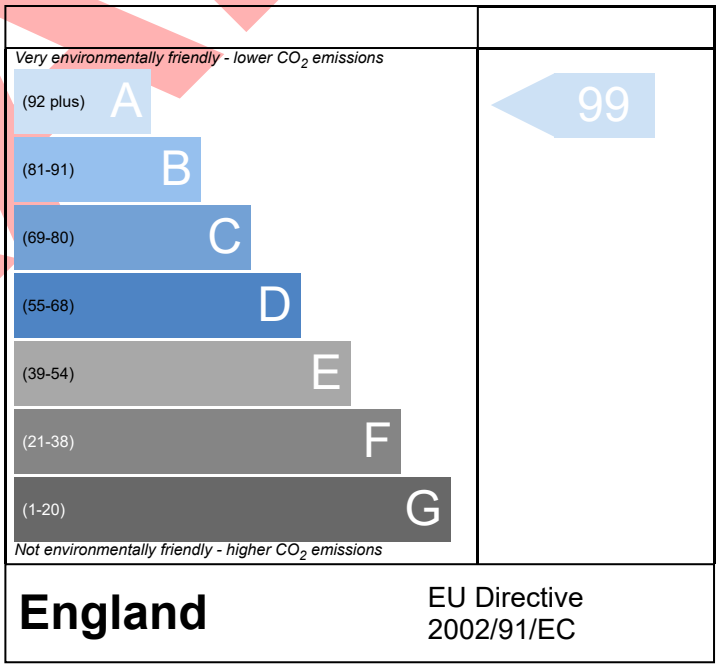
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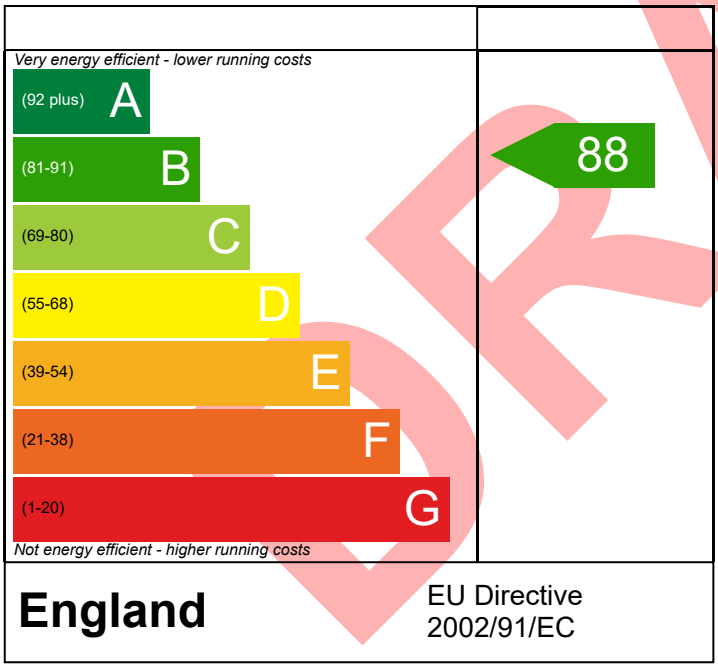
Hornsey park road, A520, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	73.4 m²
DRRN:	

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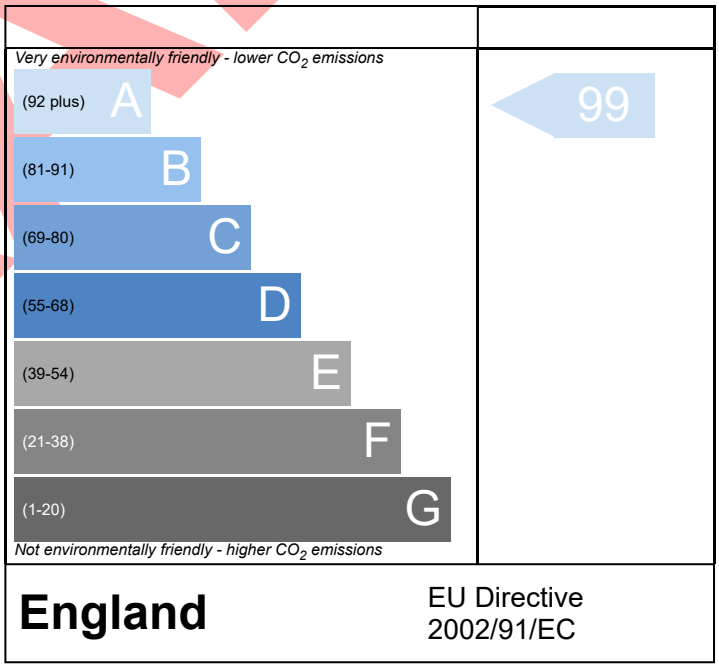
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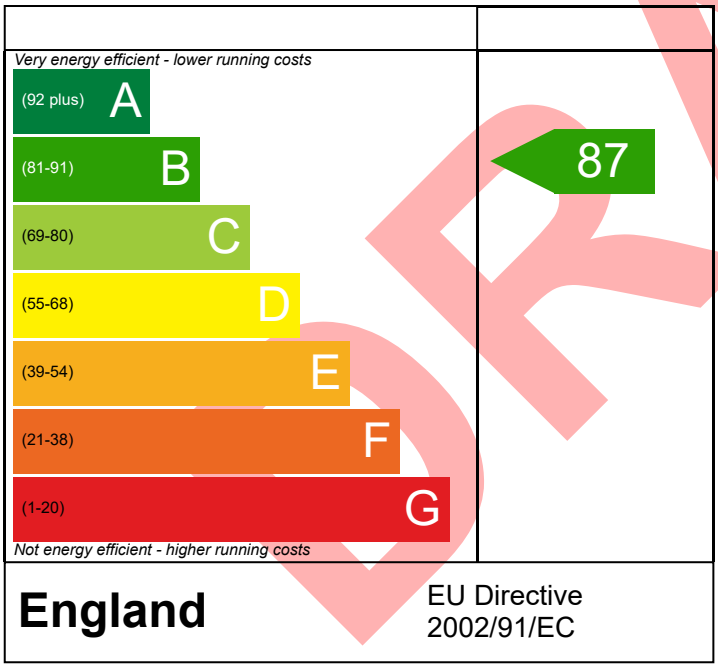
Hornsey park road, A521, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	58.8 m²
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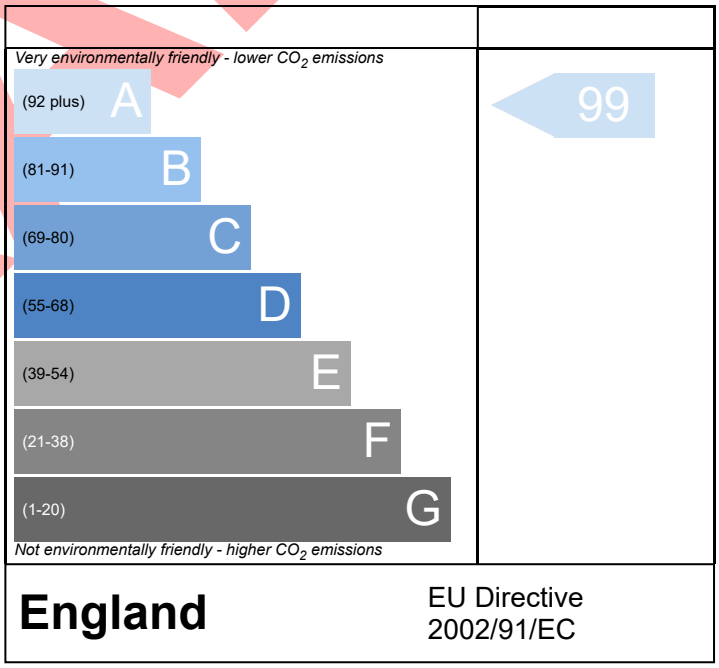
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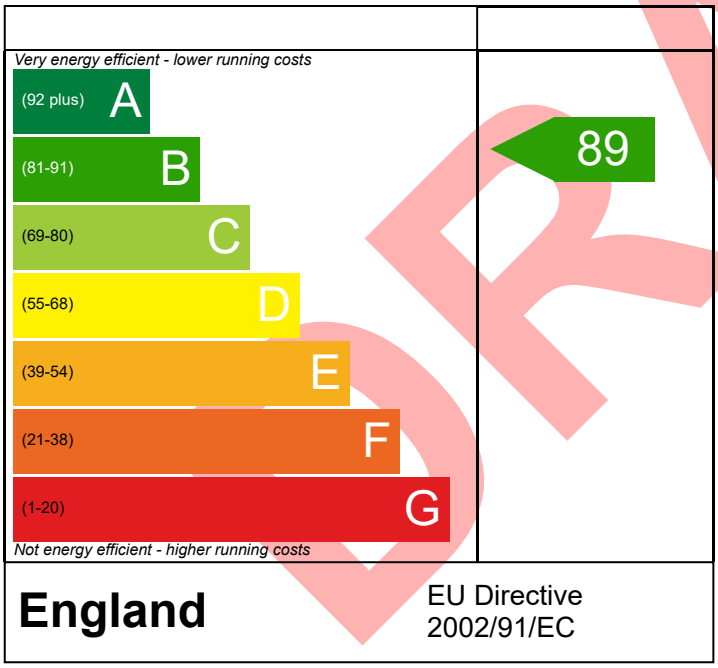
Hornsey park road, B11, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	71.3 m²
DRRN:	

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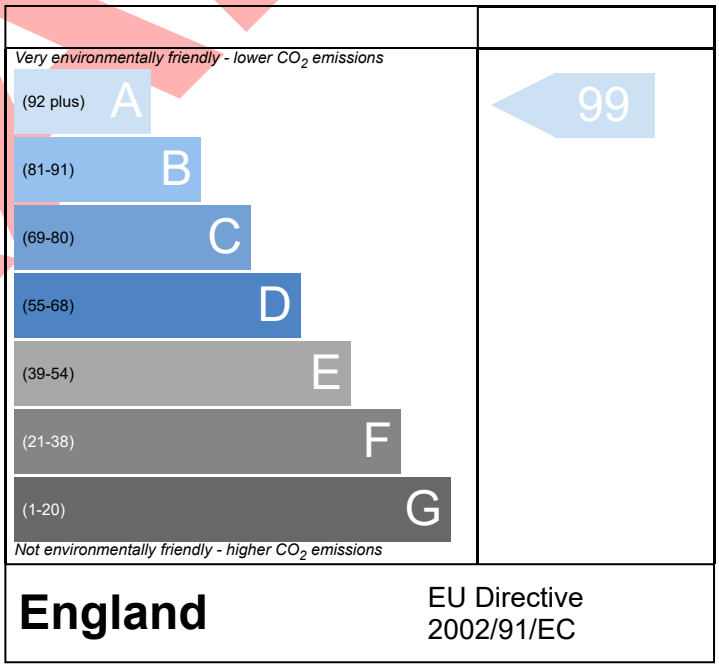
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Predicted Energy Assessment

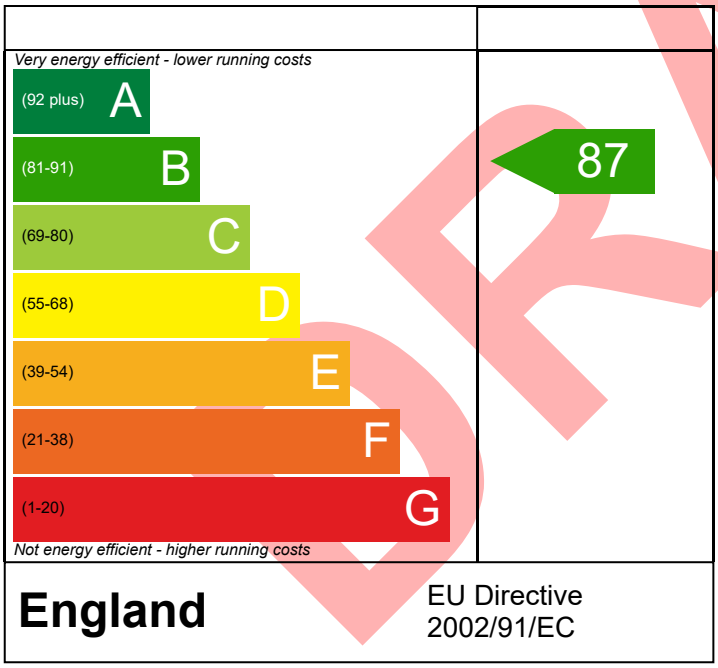
Hornsey park road, B12, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	50.9 m²
DRRN:	

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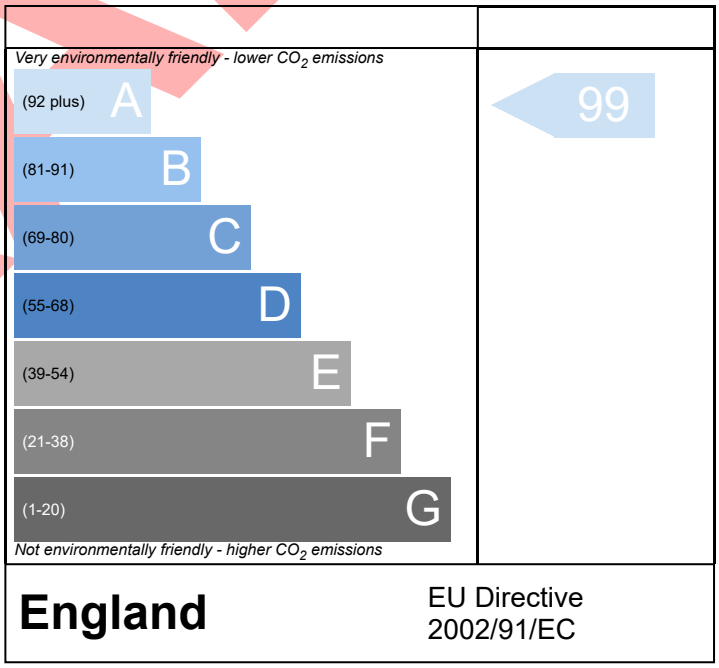
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency 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.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

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Predicted Energy Assessment

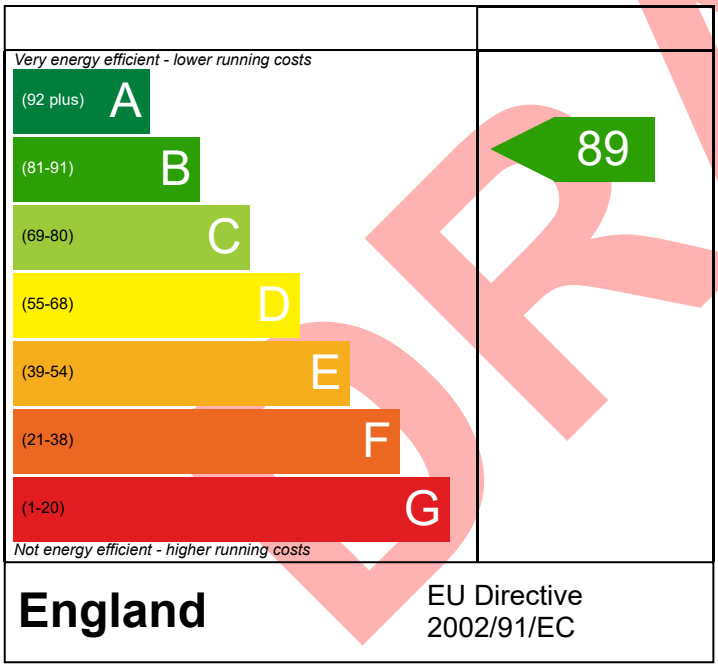
Hornsey park road, B13, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	86.6 m²
DRRN:	

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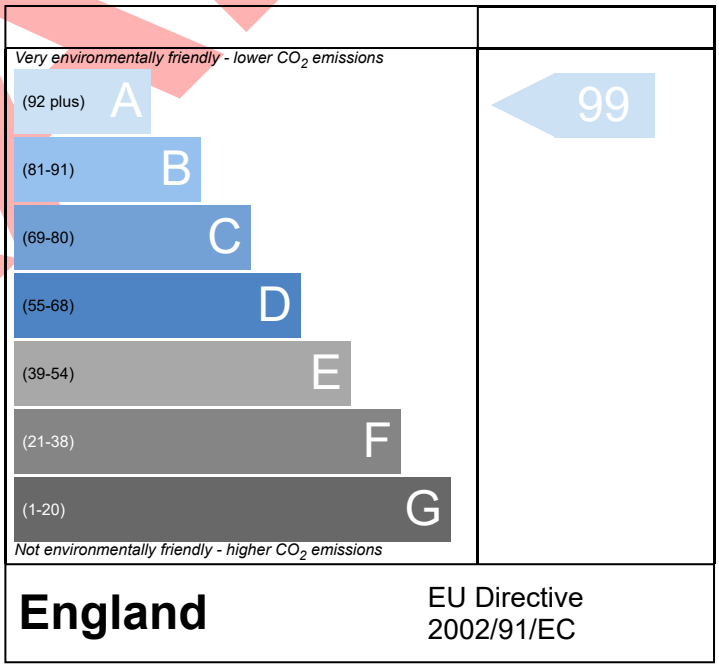
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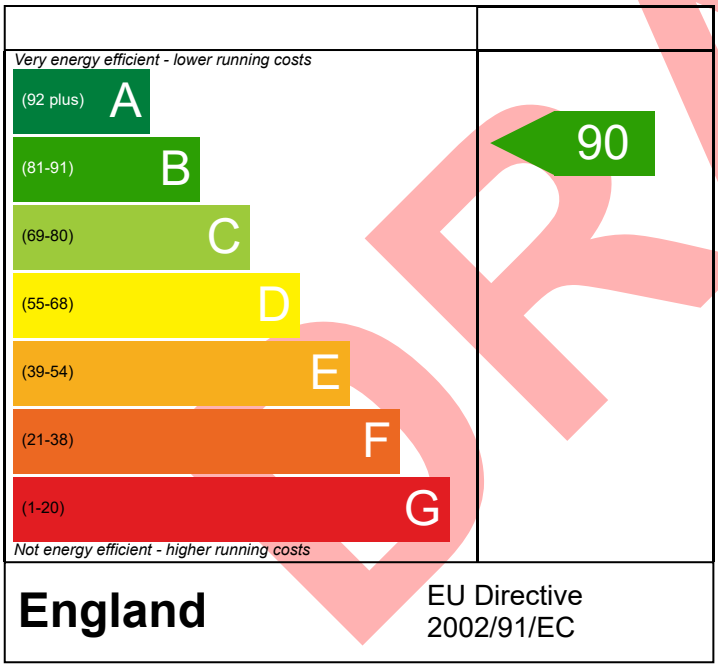
Hornsey park road, B24, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	71.3 m²
DRRN:	

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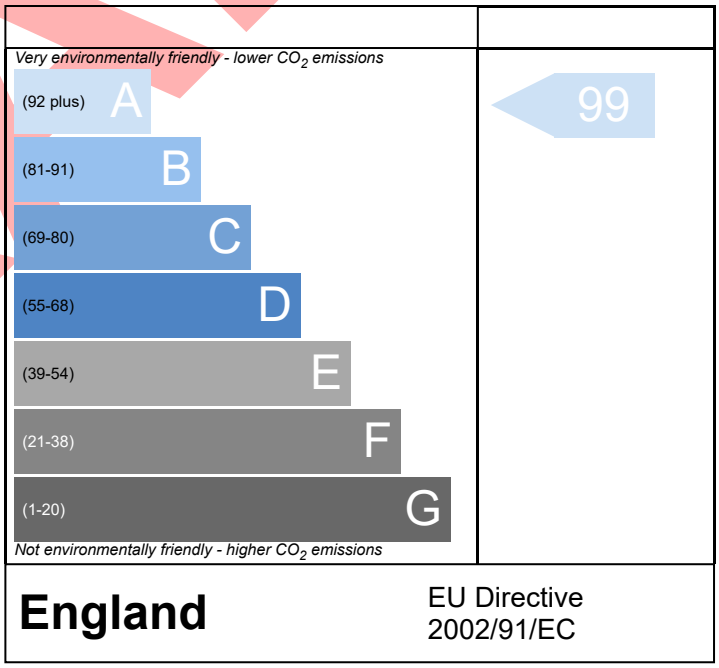
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Environmental Impact (CO_2) Rating



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Predicted Energy Assessment

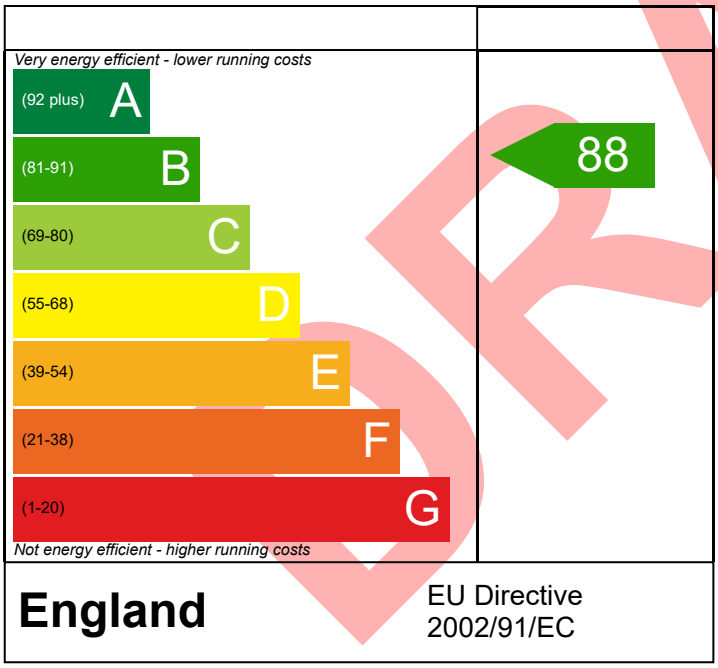
Hornsey park road, B25, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	50.9 m²
DRRN:	

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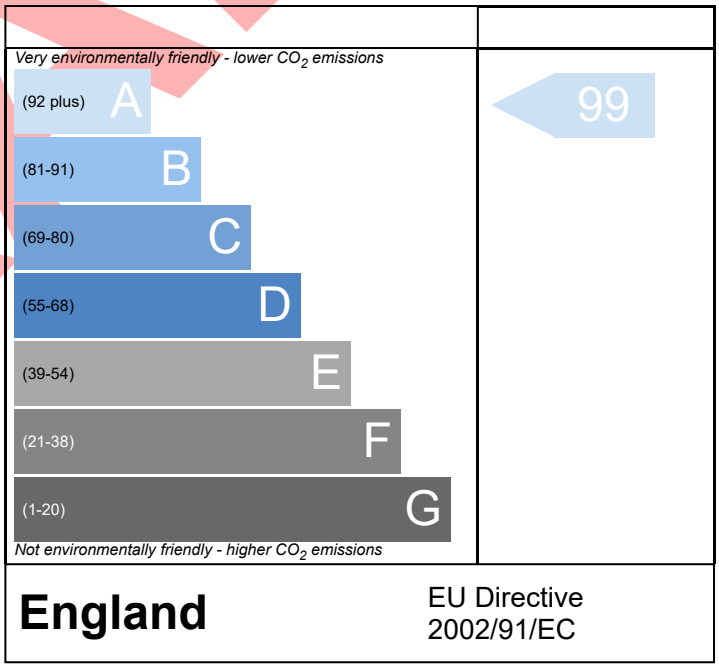
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Predicted Energy Assessment

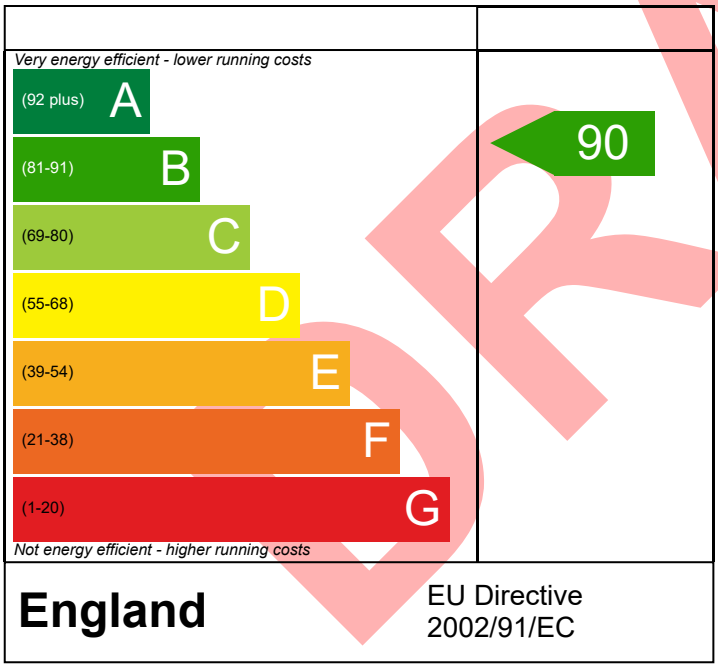
Hornsey park road, B26, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	86.6 m²
DRRN:	

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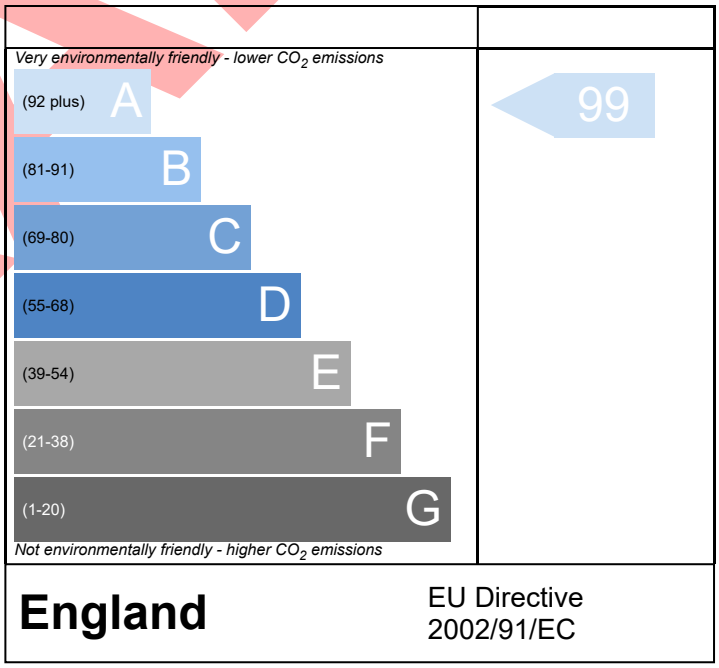
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Predicted Energy Assessment

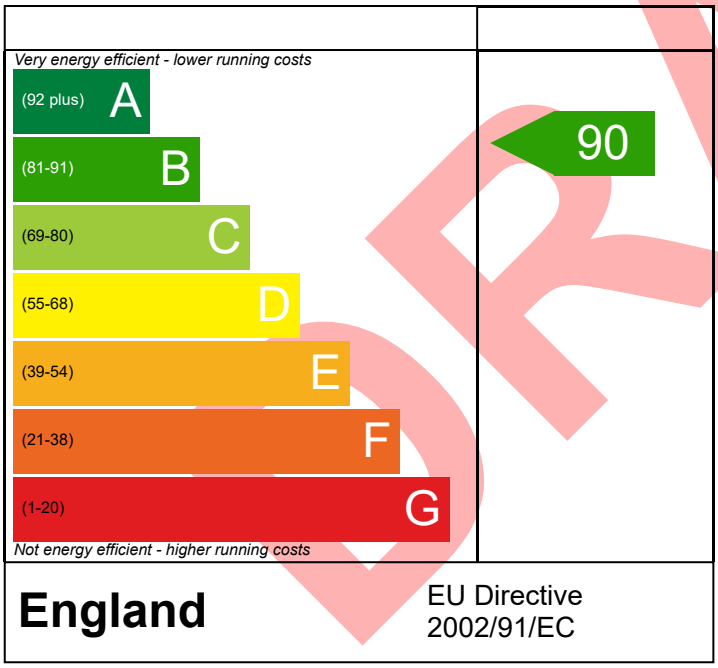
Hornsey park road, B37, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	71.3 m²
DRRN:	

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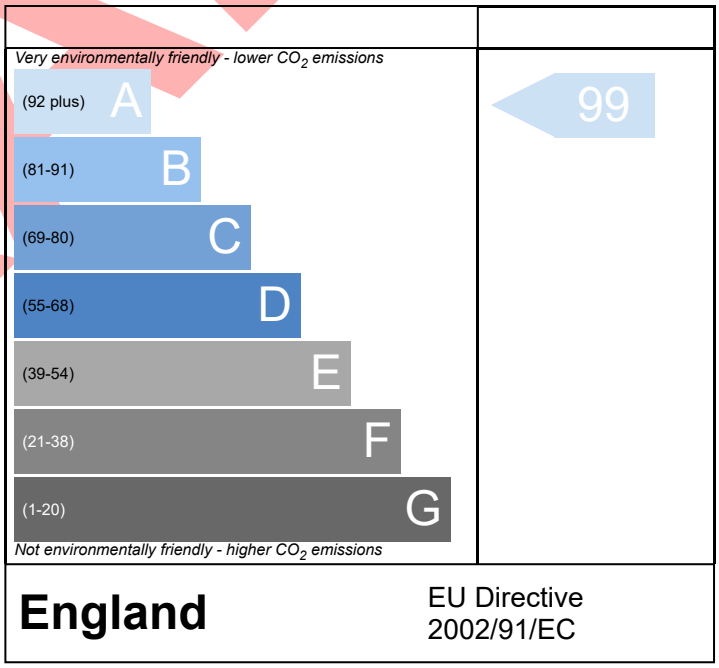
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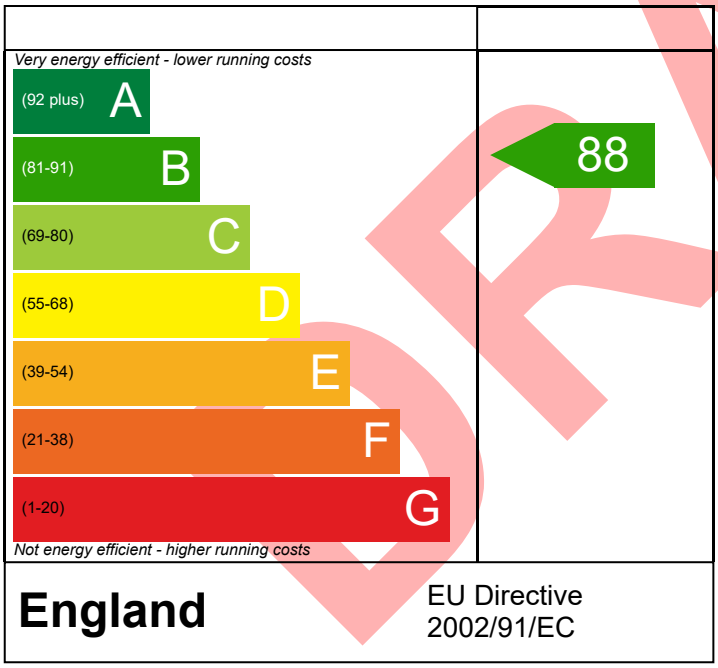
Hornsey park road, B38, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	50.9 m²
DRRN:	

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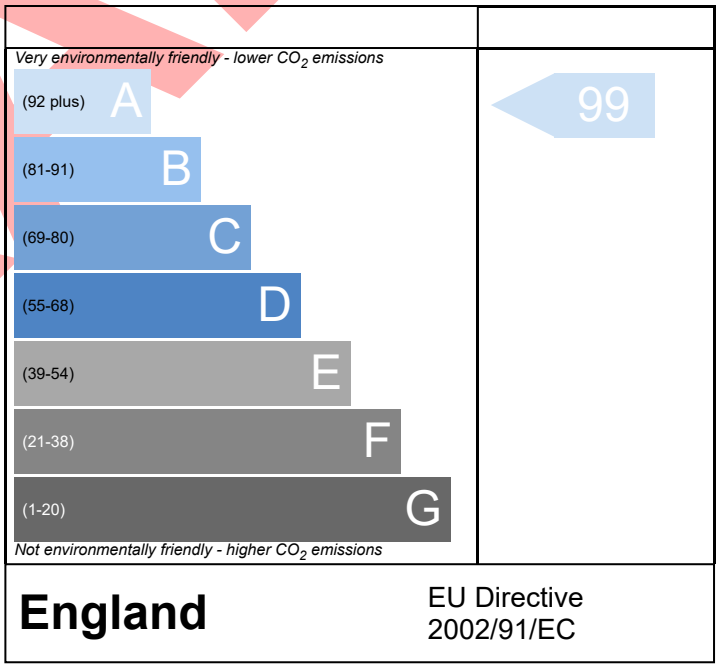
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Predicted Energy Assessment

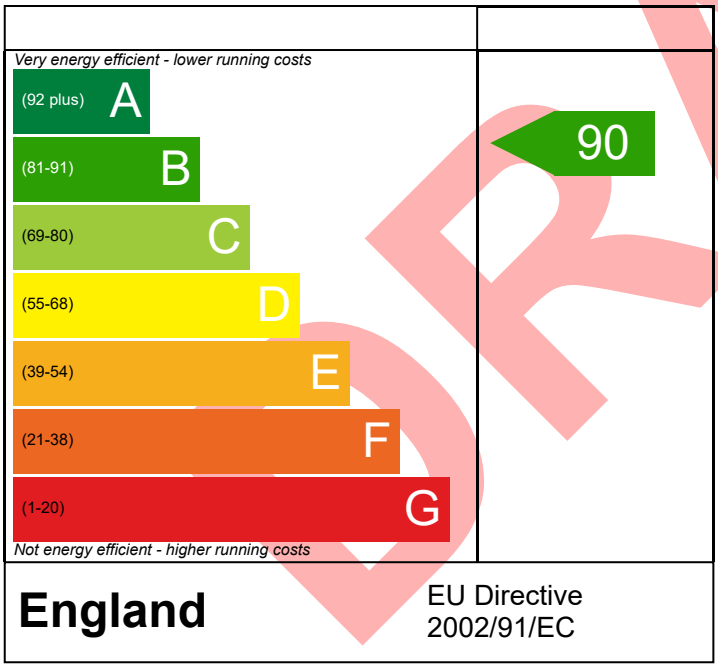
Hornsey park road, B39, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	86.6 m²
DRRN:	

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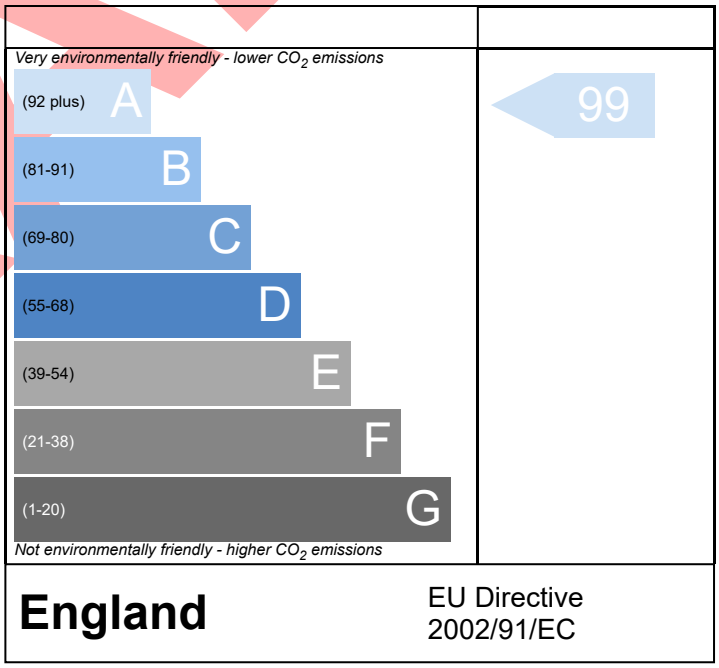
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Predicted Energy Assessment

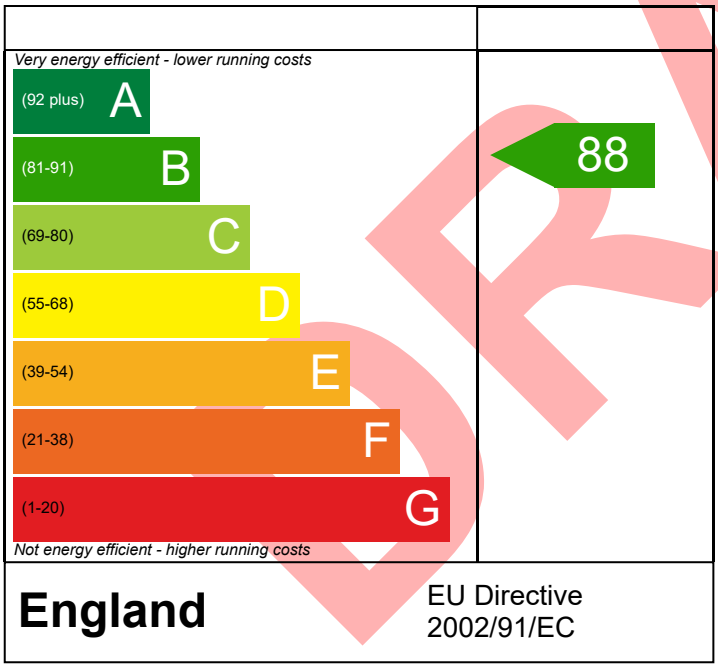
Hornsey park road, B410, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	73.9 m²
DRRN:	

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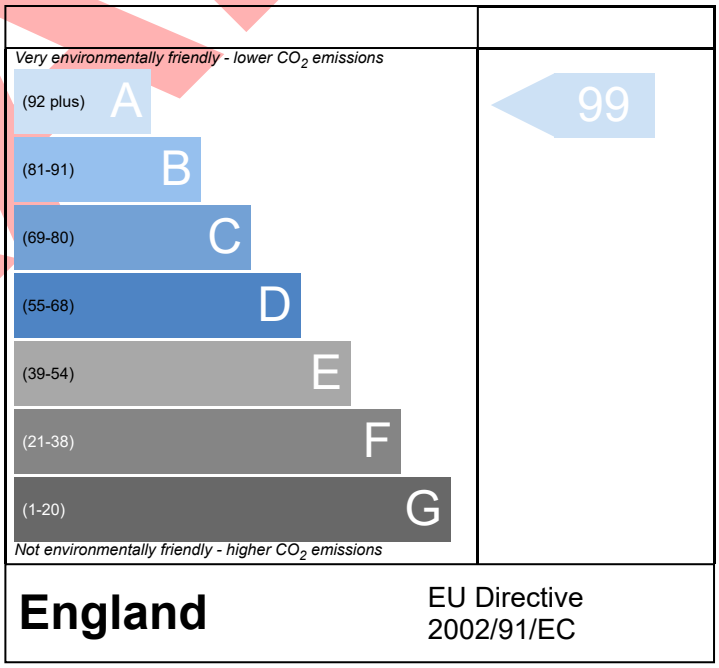
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Predicted Energy Assessment

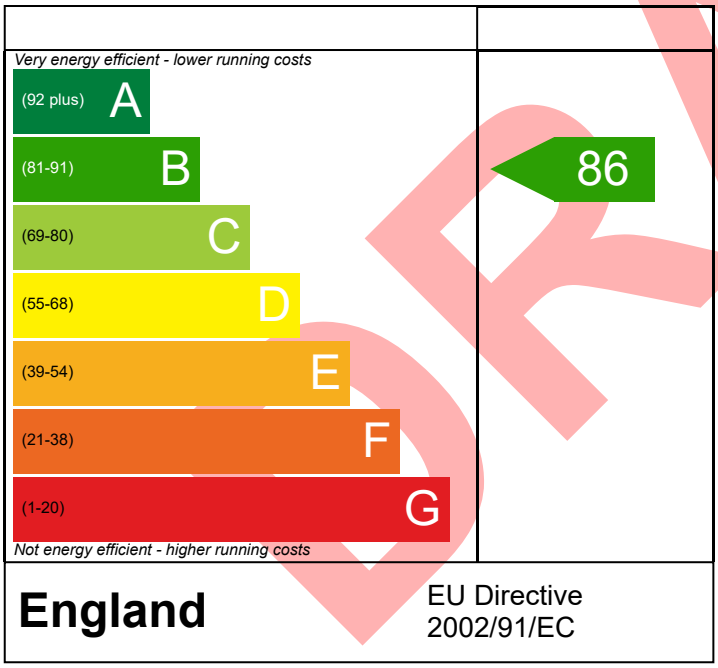
Hornsey park road, B411, N8 0JY

Dwelling type:	Flat, Semi-Detached
Date of assessment:	12/12/2023
Produced by:	Ondrej Gajdos
Total floor area:	52.7 m²
DRRN:	

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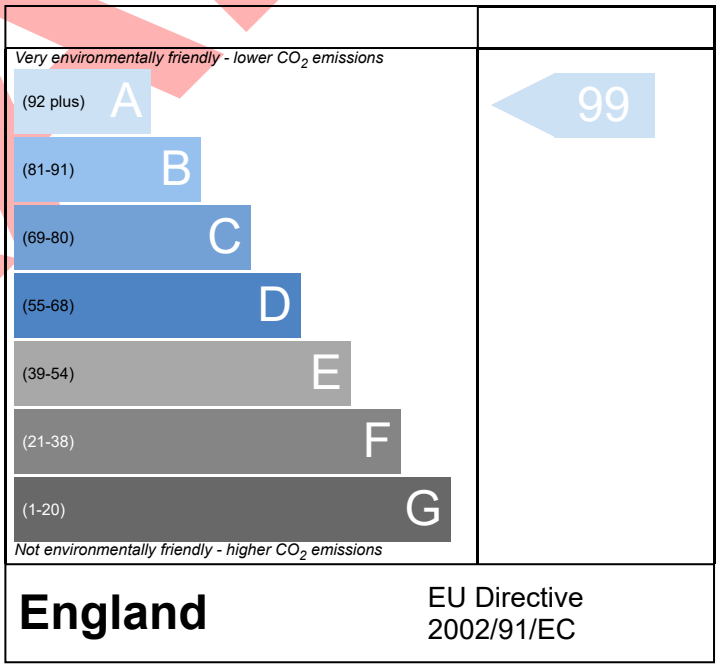
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