ENERGY ASSESSMENT

FORTESS ROAD

PROPERTY ADDRESS

3,5 & 7 FORTESS ROAD,
LONDON,
NW51AA,

DATE

October 21

PREPARED BY

EAL Consult

Contents

1. EXECUTIVE SUMMARY

This Sustainability statement has been prepared to support the planning application for the erection of 4 flats in Kentish Town. The strategy highlights how the proposed development will promote sustainability throught both design and operation and summarises the relevant regulatory and planning policies applicable and how the relevant policy targets will be addressed and achieved.

The strategy reponds to the UK Planning and regulatory framework, the national framework policy 2021 and the Camden Local Plan 2017.

In accordance with the Energy Hierarchy detailed within The New London Plan 2021, this statement outlines an overall commitment to reducing energy consumption under occupancy through the adoption of a 'Fabric First' principle, which will seek enhanced insulation standards and improved heating and lighting efficiencies in comparison to the standard requirements of Approved Document Part L1A 2013. Further carbon emission reduction can be achieved by using renewable -Photovoltaic Panels.

Energy Effcicency & Carbon Reduction:

- Passive design principles including a high level of insulation and reduced air permeabilty to deliver Part L1A 2013 compliant Building in absence of renewable technologies. It will achieve **10** reduction in carbon emissions over Part L1A baseline.

- Heatpumps / Photovoltaic Panels have been proposed for the specific scheme and will deliver a further **30.8%** reduction in regulated carbon emissions over Part L1A baseline when utilising the proposed carbon factor changes to building Regulations Part L.

Material and waste management:

- Minimising the use of virgin materials during construction by recycling and reusing where feasible.
- Low waste benchmark levels will be targeted during construction with requirements identifying that the diversion of waste from landfill is to be achieved by the contractor.

Recommendation and Results:

This report demonstrates that the proposed development by incorporating the measures above can achieve an average carbon emission reduction of **40.8% with the use of:**

- **Photovoltaic Panels.**

The following tables demonstrate the carbon emissions and savings.

Table 1. Carbon Emission Rate

	TER	Lean DER	Lean Reduction %	Green DER	Green Reduction %
Flat 1	16.2	14.24	12.1%	9.87	39.1%
Flat 2	16.2	14.25	12.0%	8.86	45.3%
Flat 3	17.38	16.15	7.1%	10.33	40.6%
Flat 4	19.92	18.07	9.3%	12.24	38.6%

SAP methodology and Building regulations Part L 2013 have been used in the assessment

Table 2. Carbon Dioxide emissions after each stage of the Energy Hierarchy

	Regulated Carbon dioxide emissions (Tonnes CO2 per annum)	
	Regulated	Total
Building Regs Notional Development	5.2	6.24
After Energy demand Reduction	4.68	5.62
After Renewables	3.08	3.7

Table 3. Carbon Dioxide Savings from each stage of the Energy Hierarchy

	Regulated Carbon dioxide savings (Tonnes CO_2)	% Reduction
Savings from energy efficiency measures	0.52	**10.0%**
Savings from Renewables	1.6	**30.8%**
Total savings	2.12	**40.8%**

2. INTRODUCTION

Site description

The development is located to the south end of Fortess Road as it connects with Highgate Road and Kentish Town RoadNumber 3 Fortess Road is occupied by a hot food Chinese takeaway at ground floor level and residential accommodation above that is accessed though the restaurant and via a separate entrance to the side. Numbers 5 and 7 Fortess Road are of similar architectural style to no. 3 but are currently vacant as a result of structural damage caused by the construction works done at no.s 1-34 to the north of the site.

Methodology

This energy assessment outlines the energy demand from the development together with the associated CO_2 emissions, using the present Building Regulations Part L as a baseline. It demonstrates how the emissions from energy use in the development will be reduced through energy efficiency measures.

The proposed scheme is required to achieve carbon emission reduction principles in accordance with the UK Planning and regulatory framework,

The methodology employed to determine the potential CO_2 savings is in accordance with the three-step Energy Hierarchy.

- **Be Lean -** Improve the energy efficiency of the scheme;
- **Be Clean -** Supply as much of the remaining energy requirement with low carbon; technologies such as district heating if available or combined heat and power (CHP); and
- **Be Green -** Offset a proportion of the remaining carbon dioxide emissions by using renewable technologies.

The government approved Standard Assessment Procedure (SAP) methodology software (2013) has been used to determine the CO_2 emissions and energy requirements. It compares CO_2 emissions from regulated energy use (DER) with those of an equivalent dwelling built to Part L1A 2013 (TER), a notional dwelling of the same size and shape. These calculations do not include emissions from cooking or appliances.

Opportunities for incorporating features into the development that contribute to the objectives of sustainable development were explored during the design process, to ensure that where possible, the proposals achieve best practice.

3. PLANNING POLICY CONTEXT

National Planning Policy Framework 2021 – emphasised the concept of sustainable development by encouraging local authorities to adopt proactive strategies to mitigate and adapt to climate change. It recommends the move to a low carbon future by:

- Avoiding increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and
- Contributing to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.
- To help increase the use and supply of renewable and low carbon energy and heat, plans should:
    - provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);
    - consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and
    - identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for colocating potential heat customers and suppliers.

The London Plan 2021 provides the strategic framework for an integrated socio-economic, transportation and environmental development plan across the capital to 2050. The Plan seeks to ensure new developments are designed to enable the efficient use of energy and support the development of sustainable energy infrastructure to produce energy more efficiently. It sets out a range of policies that apply to new developments.

Policy SI 2 Minimising Greenhouse Gas Emissions:

A. Development proposals should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy: a) Be lean: use less energy and manage demand during operation, b) Be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly, c) Be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site.

B. Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.

C. A minimum on-site reduction of at least 35 per cent beyond Building Regulations is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either: 1) through a cash in lieu contribution to the borough's carbon offset fund, or 2) off-site provided that an alternative proposal is identified, and delivery is certain.

D. Boroughs must establish and administer a carbon offset fund. Offset fund payments must be ring-fenced to implement projects that deliver carbon reductions. The operation of offset funds should be monitored and reported on annually.

E. Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.
F. Development proposals referable to the Mayor should calculate whole lifecycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

9.2.1 The Mayor is committed to London becoming a zero-carbon city. This will require reduction of all greenhouse gases, of which carbon dioxide is the most prominent. London's homes and workplaces are responsible for producing approximately 78 per cent of its greenhouse gas emissions. If London is to achieve its objective of becoming a zero-carbon city by 2050, new development needs to meet the requirements of this policy. Development involving major refurbishment should also aim to meet this policy.

9.2.2 The energy hierarchy should inform the design, construction, and operation of new buildings. The priority is to minimise energy demand, and then address how energy will be supplied and renewable technologies incorporated. An important aspect of managing demand will be to reduce peak energy loadings.

Camden Local Plan 2017

Policy CC1 Climate change mitigation
The Council will require all development to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation.
We will:

a. promote zero carbon development and require all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy;
b. require all major development to demonstrate how London Plan targets for carbon dioxide emissions have been met;
c. ensure that the location of development and mix of land uses minimise the need to travel by car and help to support decentralised energy networks;
d. support and encourage sensitive energy efficiency improvements to existing buildings;
e. require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building; and
f. expect all developments to optimise resource efficiency.

For decentralised energy networks, we will promote decentralised energy by:

g. working with local organisations and developers to implement decentralised energy networks in the parts of Camden most likely to support them;
h. protecting existing decentralised energy networks (e.g. at Gower Street, Bloomsbury, King's Cross, Gospel Oak and Somers Town) and safeguarding potential network routes; and
i. requiring all major developments to assess the feasibility of connecting to an existing decentralised energy network, or where this is not possible establishing a new network.

To ensure that the Council can monitor the effectiveness of renewable and low carbon technologies, major developments will be required to install appropriate monitoring equipment.

4. ENERGY STRATEGY

The Energy strategy for the proposed housing is based on the Building Regulations Part L1A; it adopts a set of principles to guide design and decisions regarding energy, balanced with the need to optimise environmental and economic benefits. It seeks to incorporate energy efficiency through the approach detailed below.

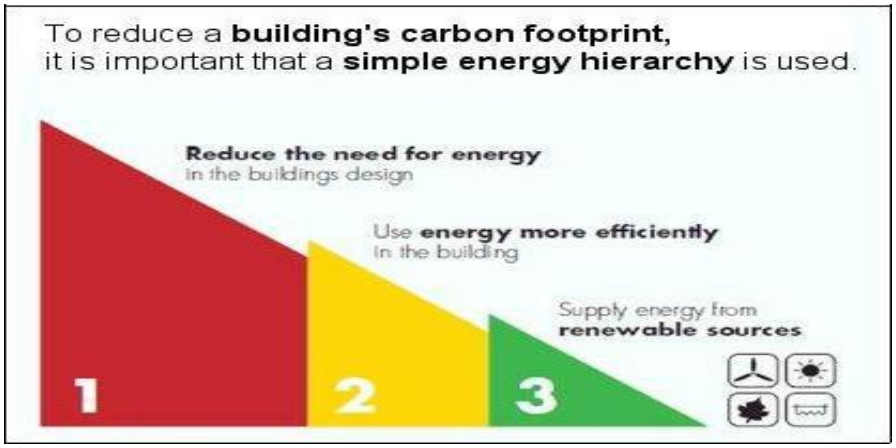

Figure 1. Energy Hierarchy

Be 'Lean' - Demand Reduction

The building fabric performance and engineering systems have been optimised in order to use less energy prior to the inclusion or consideration of Low and Zero Carbon (LZC) Technology.

Passive Design Measures:

Fabric Performance - The fabric performance values aim to reduce unwanted heat loss and heat gains, whilst maintaining a comfortable internal environment.

Table 4. Fabric energy Efficiency Standard

Thermal element	Part L1A Minimum Standard
Wall	0.30W/m^2k
Roof	0.20 W/m^2k
Floor	0.25 W/m^2k
Glazing	1.2 W/m^2k
Doors	1.2 W/m^2k

The heat loss of different building elements is dependent upon their U –value. A building with low U values provides better levels of insulation and reduced heating demand.

The development will incorporate high levels of insulation and efficient glazing; thereby reduce demand for space heating. The table below shows the U values for the development and the associated improvements over Building Regulations.

Table 5. Energy Efficient design Specification

Element	Standard	Specification
Wall	0.30 W/m²k	0.15W/m²k
Floor	0.25W/ m²k	0.17W/m²k
Roof	0.2 W/ m²k	0.13 W/ m²k
Glazing	1.4 W/ m²k	1.12 W/ m²k

Space Heating & Cooling - Space heating could be provided by underfloor heating for each flat;

Efficient Lighting and Controls - Throughout the development natural lighting will be optimised. The development will also incorporate low energy light fittings throughout. All light fittings will be specified as low energy lighting and will accommodate compact fluorescent (CFLs) or fluorescent luminaries only. Internal areas that are not frequently used will be fitted with occupant sensors.

Ventilation - The use of natural ventilation is proposed for the flats.

Domestic hot water (DHW) system – domestic hot water is supplied for the flats via the Combi-boiler and cylinder.

Be 'Clean' – Supply Energy Efficiently

The Be Clean step of the energy hierarchy refers to the use of 'Clean energy supply'. This includes, but is not limited to, the use of Combined Heat and Power (CHP) and District Heat Networks. Policy TP1 seeks for new development to promote the use of CHP and district heating.

In light of the small scale nature of the proposed development, it is apparent that the use of CHP is also technically and financially unviable in this instance.

Be 'Green' - Renewable Energy

Once energy demand reduction measures have been applied, methods for generating low and zero carbon energy can be assessed. The following renewable technologies can be considered for the project: Biomass, Water source heat pump, air source heat pump, Wind energy and photovoltaic panels.

Table 6. Renewable technologies

Technology	Pros	Cons
Biomass Heating A biomass system designed for wood pellets, which have a high-energy content, would fuel this development. 	• Less volume of storage • Less maintenance and produce considerably less ash residue	• Nox Emissions which may impacts • High Costs • Not suitable for the project
Ground Source Heat Pump It circulates a mixture of water and antifreeze around a loop of pipe, called a ground loop, which is buried in the garden. Heat from the ground is absorbed into the fluid and then passes through a heat exchanger into the heat pump. 	• Use all the year	• High Costs • Not suitable for this project
Air Source Heat Pump They are an efficient and environmentally-friendly way of heating using air drawn freely from the atmosphere. They operate rather like a refrigerator in reverse, absorbing heat from the air into a working fluid which is passed into a compressor where its temperature is increased before it is transferred into the heating and hot water circuits of the building.	• Can generates less CO_2 than conventional heating systems. • Cheaper • Provides heating and hot water • Less maintenance • Can be used as air-conditioning in the summer	• Needs electricity • Can be noisy
Wind Turbines	• Cheaper • Less CO_2	• Local wind speeds in the area is likely to be

Wind turbines are available in various sizes from large rotors able to supply whole communities to small roof or wall-mounted units for individual dwellings. 		below the level generally required for investment in large wind turbines. • Noise and signal interference. • Detrimental aesthetic impact
Photovoltaic Panels (PV) Photovoltaic panels extract the energy of the sun to generate electricity. They operate most efficiently when oriented to the south and are inclined to about 35 degrees. 	• Cheaper • Less CO_2 • No input power in order to generate electricity.	

On review of the above technologies, it has been concluded that the use of Photovoltaic Panels will achieve a reduction of **40.8%** in carbon emission rate.

	System size	Pitch	Orientation	No of Panels	Area
Fortess Road	3.5 kWp	Horizontal	South facing	14	22.4m^2

5. SUSTAINABLE DESIGN

The proposed project incorporates sustainable design and construction measures capable of mitigating and adapting to climate change to meet future needs. This section details site-specific initiatives which demonstrate how the conversion helps to meet the sustainability objectives set out in the National Planning Framework 2021.

Energy Use and Pollution
The design of the development has taken into consideration day lighting to habitable spaces to improve the wellbeing of occupants. Good levels of daylight will offer occupants a pleasant and highly valued connection to the outdoors and plenty of natural light. It will also reduce the use of artificial lighting and therefore energy use. All light fittings will be specified as low energy lighting.
No external lighting is required. The location and orientation of windows help to create a design that avoids overheating in the summer.

Pollution: Air, Noise and Light
The layout of the development can provide good internal air quality for habitable areas but not too much so as to waste heat. The use of openable windows will create horizontal airflow. By achieving a good naturally ventilated building the energy demand for air conditioning and mechanical ventilation will thereby be eliminated within the development.

The development will not increase the air pollution of the area by reducing as a start, its energy consumption, which in turn will reduce emissions that lead to air pollution.
Other measures will include:

a. Use of eco-friendly building materials
b. Non-toxic paints
c. Installation of energy efficient appliances and devices
d. Use of renewable technologies

Light pollution can best be described as artificial light that is allowed to illuminate or intrude upon areas not intended to be lit. Light in the wrong place at the wrong time can be intrusive.
Intrusive light is over bright or poorly directed lights shining onto neighbouring property which affect the neighbours' right to enjoy their property. Therefore, the proposal will incorporate lighting measures in order to avoid causing a nuisance.

Water: Water Efficiency
In domestic and non-domestic buildings, the demand for water can be reduced as much as 50% using a variety of simple and innovative strategies that are integrated into the plumbing and mechanical systems. In order to reduce water consumption the proposed development will include efficient fixtures with low flow rates. Total internal water consumption will not exceed 105 litres/person/day.

Table 7. Water Fittings Standards

Schedule Appliance Water Consumption		
Appliance	**Flow rate or Capacity**	**Total Litres**
WC	Dual flush WC 4/2.6 litre	14.72
Basin	1.7 litres/min	5.98
Shower	8 litres/minute flow	24.00
Bath	160 litres	25.60
Sink	4 litres/min	14.13
W/machine	Default used	16.66
Dish Washer	Default used	3.90
		104.99

Pollution

All contractors would be required to sign up to the nationally recognised Considerate Constructors Scheme which requires, amongst other things that dust emissions, potential noise pollution, impacts on water quality and the potential for ground contamination are minimised during demolition and construction. The Contractor would also be obliged to adhere to a site specific Code of Construction Practice to reduce potential nuisance effects.

Waste

A space for reuse and recycling has been included at the back of the ground floor unit for the residents exclusive use. Composting is also considered to reduce the overall household.

Flood Risk

The development site is located in a Low Flood Risk Area on the Environment Agency Flood Risk Map.

Biodiversity

The proposed development will incorporate measures to support and enhance the environment through consideration of the existing site, including measures to mitigate the impact of the development and enhance site biodiversity.

Urban Greening Factor

Due the constraints of the site and the lack of landscape, we can't assess the urban greening factor. However, we advise on installing green walls and/or green roofs which are the only options provided.

6. Circular economy

Materials efficiency

Materials can have a significant impact on environmental performance, both in construction but also ongoing use. Materials used for the building will have lower environmental impacts over their lifecycle. This applies to the materials used in the external walls, roof and glazing. This extends to elements of the materials category such as the basic building materials (internal walls) and the finishing elements (fascia, skirting, and furniture).

It is expected that all timber used in the development will come from a legal Source (FSC Scheme). At least 80% of the building materials will be responsibly sourced and will use suppliers who can provide an EMS certificate or equivalent. Materials rated with an A or B in the BRE Green Guide to Specification will be preferred.

Other measures will be implemented:

- The reuse of existing materials from the demolition of existing buildings
- At least 20% of the total value of materials used should derive from recycled and reused content in the products and materials selected;
- Steel will have a high recycled content;
- Concrete will have a Ground Granulated Blast Furnace Slag (GGBS) value of 50%.

Resource efficiency

- Pre-demolition audit to be carried out and target benchmark of ≤ 11.1 tonnes of construction waste per 100m2;

Diversion of waste from landfill

- Where possible, segregation of recyclable and non-recyclable material will be employed for all waste generated throughout the construction process. Furthermore, material will be re-used on-site where feasible;
- Pre-fabrication of materials/elements such as bathroom pods, pipework and riser materials will be considered;
- Reusable packing solutions with key product manufacturers will be explored at the earliest opportunity. Solutions may include flat pallets, bulk bags, steel stillages and returnable cable drums;
- Construction waste – minimum 80% diversion from landfill rate;
- Demolition waste – minimum 90% diversion from landfill rate;
- Operational waste – Target diversion from landfill rate to be set.

7. CONCLUSION

The development has been designed to exceed Part L1A building regulations requirements. In line with the national and local policies, regulated CO_2 emissions from the development will be reduced by **40.8%** from the notional emissions once energy efficiency measures and lean measures are taken into account.

In order to achieve the required carbon emissions reduction, the report concludes and proposes the use of energy efficient measures outlined in the section 4 of this report.

An appraisal of the proposed development has been undertaken against key sustainability objectives identified from relevant policy guidance. The framework for the appraisal was guided by the National Plan. This process has ensured that the development responds to the sustainable development objectives that are relevant to the area. Key sustainability initiatives in ecology, waste management, water, health and wellbeing, materials, pollution and Surface water management have been incorporated in the design of the proposed Development.

8. APPENDIX

I. SAP Calculations

Project Information

Building type Mid-floor flat

Reference

Date 8 January 2019

Email: none Project Flat 1
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m^2)	Av. Storey height (m)	Volume (m^3)	
First floor	76.96	2.51	193.17	(3a)
	76.96			**(4)**
			193.17	**(5)**

2. Ventilation rate

			m³ per hour	
	main + seondary + other heating			
Number of chimneys	0 + 0 + 0	x 40	0.00	(6a)
Number of open flues	0 + 0 + 0	x 20	0.00	(6b)
Number of intermittent fans	3	x 10	30.00	(7a)
Number of passive vents	0	x 10	0.00	(7b)
Number of flueless gas fires	0	x 40	0.00	(7c)

		Air changes per hour	
		0.16	**(8)**
Pressure test, result q50	3.90		(17)
Air permeability		0.35	(18)
		2.00	**(19)**
		0.85	**(20)**
Infiltration rate incorporating shelter factor		0.30	(21)

Infiltration rate modified for monthly wind speed

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70

52.50 (22)

Wind Factor

1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18

13.13 (22a)

Adjusted infiltration rate (allowing for shelter and wind speed)

0.38	0.37	0.36	0.33	0.32	0.28	0.28	0.28	0.30	0.32	0.33	0.35

3.91 (22b)

Ventilation : natural ventilation, intermittent extract fans

Effective air change rate

0.57	0.57	0.57	0.55	0.55	0.54	0.54	0.54	0.54	0.55	0.56	0.56	(25)

3. Heat losses and heat loss parameter

Element	Gross area, m²	Openings m²	Net area A, m²	U-value W/m²K	A x U W/K	kappa-value kJ/m²K	A x K kJ/K	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East) FRONT			**12.670**	**1.05 (1.10)**	13.35			(27)
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**5.470**	**1.05 (1.10)**	5.76			(27)
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**3.920**	**1.10**	4.31			(26)
Walls HALLWAY			22.62	0.13 (Ru=0.82)	3.02	70.00	1583.40	(29)
Walls EXTERNAL #WINDOWS & DOORS			36.50	0.15	5.47	70.00	2555.00	(29)
Party wall SOLID			16.69	0.00	0.00	180.00	3004.20	
Party floor ANOTHER DWELLING BELOW			76.96	0.00	0.00	40.00	3078.40	
Party ceiling ANOTHER DWELLING ABOVE			76.96	0.00	0.00	30.00	2308.80	

Total area of external elements Sigma A, m²	81.18	(31)
Fabric heat loss, W/K	31.92	(33)
Heat capacity	12529.80	(34)
Thermal mass parameter, kJ/m²K	162.81	(35)
Effect of thermal bridges	6.50	(36)
Total fabric heat loss	38.42	(37)

Ventilation heat loss calculated monthly

36.47	36.29	36.11	35.29	35.14	34.42	34.42	34.29	34.70	35.14	35.45	35.77	(38)

Heat transfer coefficient, W/K

74.89	74.71	74.53	73.71	73.56	72.84	72.84	72.71	73.12	73.56	73.87	74.20	
											73.71	(39)

Heat loss parameter (HLP), W/m²K

0.97	0.97	0.97	0.96	0.96	0.95	0.95	0.94	0.95	0.96	0.96	0.96	
HLP (average)											0.96	(40)

Number of days in month (Table 1a)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements **kWh/year**

Assumed occupancy, N 2.40 (42)

Annual average hot water usage in litres per day Vd,average 96.07 (43)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage in litres per day for each month												
105.67	101.83	97.99	94.14	90.30	86.46	86.46	90.30	94.14	97.99	101.83	105.67	(44)
Energy content of hot water used												
156.71	137.06	141.43	123.30	118.31	102.10	94.61	108.56	109.86	128.03	139.76	151.77	

Energy content (annual) 1511.50 (45)

Distribution loss

23.51	20.56	21.21	18.50	17.75	15.31	14.19	16.28	16.48	19.20	20.96	22.76	(46)

store loss determined from EN 13203-2 tests, taken from boiler data record

0.00 (50)

Hot water cylinder loss factor (kWh/day) 0.0000 (51)

Volume factor 0.0000 (52)

Temperature factor 0.0000 (53)

Energy lost from store (kWh/day) 0.00 (55)

Total storage loss

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(56)
Net storage loss												
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(57)
Primary loss												
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(59)
Combi loss calculated for each month												
26.47	23.89	26.39	25.45	26.24	25.33	26.13	26.20	25.40	26.33	25.56	26.45	(61)
Total heat required for water heating calculated for each month												
183.18	160.95	167.82	148.76	144.56	127.42	120.74	134.77	135.26	154.36	165.32	178.21	(62)
Output from water heater for each month, kWh/month												
183.18	160.95	167.82	148.76	144.56	127.42	120.74	134.77	135.26	154.36	165.32	178.21	(64)

1821.32 (64)

Heat gains from water heating, kWh/month

58.72	51.54	53.62	47.36	45.90	40.28	37.99	42.65	42.88	49.15	52.86	57.07	(65)

5. Internal gains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains, Watts												
144.16	144.16	144.16	144.16	144.16	144.16	144.16	144.16	144.16	144.16	144.16	144.16	(66)
Lighting gains												
47.47	42.16	34.29	25.96	19.40	16.38	17.70	23.01	30.88	39.21	45.76	48.79	(67)
Appliances gains												
317.87	321.16	312.85	295.16	272.82	251.83	237.80	234.50	242.81	260.51	282.85	303.84	(68)
Cooking gains												
51.82	51.82	51.82	51.82	51.82	51.82	51.82	51.82	51.82	51.82	51.82	51.82	(69)
Pumps and fans gains												
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	(70)
Losses e.g. evaporation (negative values)												
-96.11	-96.11	-96.11	-96.11	-96.11	-96.11	-96.11	-96.11	-96.11	-96.11	-96.11	-96.11	(71)
Water heating gains												
78.93	76.70	72.07	65.78	61.69	55.94	51.06	57.32	59.55	66.06	73.41	76.71	(72)
Total internal gains												
547.13	542.90	522.08	489.77	456.79	427.02	409.43	417.70	436.12	468.65	504.90	532.21	(73)

6. Solar gains (calculation for January)

	Area & Flux	g & FF	Shading	Gains	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East)	0.9 x 12.670	19.64	0.63 x 0.80	0.77	86.9136	
FRONT						
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 5.470	19.64	0.63 x 0.80	0.77	37.5231	
REAR						
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 3.920	19.64	0.63 x 0.80	0.77	26.8904	
REAR						
Total solar gains, January					151.33	(83-1)

Solar gains

151.33	296.03	487.52	711.01	871.37	892.00	849.23	729.47	567.00	351.26	188.69	124.44	(83)

Total gains

698.46	838.92	1009.60	1200.78	1328.16	1319.03	1258.66	1147.18	1003.12	819.92	693.58	656.65	(84)

Lighting calculations

	Area	g	FF x Shading	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East)	0.9 x 12.67	0.80	0.80 x 0.83	6.06
FRONT				
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 5.47	0.80	0.80 x 0.83	2.62
REAR				

7. Mean internal temperature

Temperature during heating periods in the living area, Th1 (°C) 21.00 (85)

Heating system responsiveness 1.00

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau											
46.48	46.59	46.70	47.22	47.32	47.78	47.78	47.87	47.60	47.32	47.12	46.91
alpha											
4.10	4.11	4.11	4.15	4.15	4.19	4.19	4.19	4.17	4.15	4.14	4.13
Utilisation factor for gains for living area											
0.96	0.92	0.83	0.67	0.50	0.35	0.25	0.29	0.49	0.78	0.93	0.97 (86)
Mean internal temperature in living area T1											
19.97	20.24	20.57	20.85	20.96	20.99	21.00	21.00	20.97	20.77	20.32	19.92 (87)
Temperature during heating periods in rest of dwelling Th2											
20.11	20.11	20.11	20.12	20.12	20.13	20.13	20.13	20.13	20.12	20.12	20.11 (88)
Utilisation factor for gains for rest of dwelling											
0.95	0.90	0.81	0.64	0.46	0.30	0.20	0.24	0.43	0.74	0.91	0.96 (89)
Mean internal temperature in the rest of dwelling T2											
18.76	19.13	19.59	19.95	20.08	20.12	20.13	20.13	20.10	19.87	19.26	18.69 (90)

Living area fraction (34.89 / 76.96) 0.45 (91)

Mean internal temperature (for the whole dwelling)

19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24 (92)

Apply adjustment to the mean internal temperature, where appropriate

19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24 (93)

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains											
0.94	0.90	0.80	0.65	0.47	0.32	0.23	0.26	0.46	0.75	0.90	0.95 (94)
Useful gains											
657.20	751.70	811.88	775.06	628.94	428.36	285.28	298.95	457.30	611.19	627.12	624.25 (95)
Monthly average external temperature											
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20 (96)
Heat loss rate for mean internal temperature											
1124.15	1100.70	1008.94	844.66	645.97	431.06	285.73	299.75	467.86	712.15	933.89	1116.22 (97)
Fraction of month for heating											
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
Space heating requirement for each month, kWh/month											
347.41	234.52	146.61	50.12	12.67	-	-	-	-	75.11	220.88	366.02

Total space heating requirement per year (kWh/year) (October to May) 1453.34 (98)

Space heating requirement per m² (kWh/m²/year) 18.88 (99)

8c. Space cooling requirement - not applicable

9a. Energy requirements

kWh/year

No secondary heating system selected

Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main heating system	93.20%	(206)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement												
347.41	234.52	146.61	50.12	12.67	-	-	-	-	75.11	220.88	366.02	(98)
Appendix Q - monthly energy saved (main heating system 1)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space heating fuel (main heating system 1)												
372.76	251.63	157.31	53.77	13.59	-	-	-	-	80.59	237.00	392.73	(211)
Appendix Q - monthly energy saved (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space heating fuel (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendix Q - monthly energy saved (secondary heating system)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space heating fuel (secondary)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water heating												
Water heating requirement												
183.18	160.95	167.82	148.76	144.56	127.42	120.74	134.77	135.26	154.36	165.32	178.21	(64)
Efficiency of water heater												87.30 (216)
89.18	89.00	88.63	88.01	87.53	87.30	87.30	87.30	87.30	88.23	88.94	89.23	(217)
Water heating fuel												
205.41	180.84	189.35	169.02	165.16	145.96	138.30	154.37	154.93	174.95	185.88	199.72	(219)

Annual totals	kWh/year	
Space heating fuel used, main system 1	1559.38	(211)
Space heating fuel (secondary)	0.00	(215)
Water heating fuel	2063.90	(219)
Electricity for pumps, fans and electric keep-hot		
central heating pump	30.00	(230c)
boiler with a fan-assisted flue	45.00	(230e)
Total electricity for the above, kWh/year	75.00	(231)
Electricity for lighting (100.00% fixed LEL)	335.31	(232)
Energy saving/generation technologies		
Appendix Q -		
Energy saved or generated ():	0.000	(236a)
Energy used ():	0.000	(237a)
Total delivered energy for all uses	4033.58	(238)

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

10a. Fuel costs using Table 12 prices

	kWh/year	Fuel price p/kWh	£/year	
Space heating - main system 1	1559.377	3.480	54.27	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
Water heating cost	2063.90	3.480	71.82	(247)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	75.000	13.190	9.89	(249)
Energy for lighting	335.306	13.190	44.23	(250)
Additional standing charges			120.00	(251)
Electricity generated - PVs	0.000	0.000	0.00	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			300.21	(255)

11a. SAP rating

	0.42	**(256)**
	1.03	**(257)**
SAP value	85.58	
	86	(258)
SAP band	**B**	

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating, main system 1	1559.38	0.216	336.83	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	2063.90	0.216	445.80	(264)
Space and water heating			782.63	(265)
Electricity for pumps and fans	75.00	0.519	38.93	(267)
Electricity for lighting	335.31	0.519	174.02	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - µCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			995.58	(272)

	kg/m²/year	
CO2 emissions per m²	**12.94**	(273)
EI value	89.06	(273a)
EI rating	**89**	(274)
EI band	**B**	

Calculation of stars for heating and DHW

Main heating energy efficiency	(3.48 / 0.9020) x (1 + (0.29 x 0.00)) = 3.8581, stars = 4
Main heating environmental impact	(0.2160 / 0.9020) x (1 + (0.29 x 0.00)) = 0.2395, stars = 4
Water heating energy efficiency	3.48 / 0.8816 = 3.9473, stars = 4
Water heating environmental impact	0.2160 / 0.8816 = 0.2450, stars = 4

Project Information
Building type Mid-floor flat

Reference
Date 8 January 2019
Email: none Project Flat 1
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England
assessed by program JPA Designer version 6.05.054, printed on 21/10/2021 at 22:21:14

New dwelling as designed

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1 TER and DER
Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate	TER = 16.20	
Dwelling Carbon Dioxide Emission Rate	DER = 14.24	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	TFEE = 41.3	
Dwelling Fabric Energy Efficiency (DFEE)	DFEE = 32.3	OK

2a Thermal bridging
Thermal bridging calculated from linear thermal transmittances for each junction

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2b Fabric U-values

Element	Average	Highest	
Wall	0.14 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.00 (max. 0.25)	0.00 (max. 0.70)	OK
Roof	0.00 (max. 0.20)	0.00 (max. 0.35)	OK
Openings	1.10 (max. 2.00)	1.10 (max. 3.30)	OK

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3 Air permeability

Air permeability at 50 pascals:	3.90	OK
Maximum :	10.00	

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4 Heating efficiency
Main heating system:
Boiler and underfloor heating, mains gas
Vaillant ecoFIT sustain 835
Source of efficiency: from boiler database
Vaillant ecoFIT sustain 835 VUW 356/6-3 (H-GB)
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0% OK
Secondary heating system:
None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley): OK

Slight OK

Based on:

Thermal mass parameter : 162.81

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.10 W/m²K

Walls U-value 0.13 W/m²K

Design air permeability 3.9 m³/h.m²

Project Information

Building type Mid-floor flat

Reference

Date 8 January 2019

Email: none Project Flat 1
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m^2)	Av. Storey height (m)	Volume (m^3)	
First floor	76.96	2.51	193.17	(3a)
	76.96			**(4)**
			193.17	**(5)**

2. Ventilation rate

			m³ per hour	
	main + seondary + other heating			
Number of chimneys	0 + 0 + 0	x 40	0.00	(6a)
Number of open flues	0 + 0 + 0	x 20	0.00	(6b)
Number of intermittent fans	3	x 10	30.00	(7a)
Number of passive vents	0	x 10	0.00	(7b)
Number of flueless gas fires	0	x 40	0.00	(7c)

		Air changes per hour	
		0.16	**(8)**
Pressure test, result q50	3.90		(17)
Air permeability		0.35	(18)
		2.00	**(19)**
		0.85	**(20)**
Infiltration rate incorporating shelter factor		0.30	(21)

Infiltration rate modified for monthly wind speed

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70

52.50 (22)

Wind Factor

1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18

13.13 (22a)

Adjusted infiltration rate (allowing for shelter and wind speed)

0.38	0.37	0.36	0.33	0.32	0.28	0.28	0.28	0.30	0.32	0.33	0.35

3.91 (22b)

Ventilation : natural ventilation, intermittent extract fans

Effective air change rate

0.57	0.57	0.57	0.55	0.55	0.54	0.54	0.54	0.54	0.55	0.56	0.56	(25)

3. Heat losses and heat loss parameter

Element	Gross area, m²	Openings m²	Net area A, m²	U-value W/m²K	A x U W/K	kappa-value kJ/m²K	A x K kJ/K	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**5.470**	**1.05 (1.10)**	5.76			(27)
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East) FRONT			**12.670**	**1.05 (1.10)**	13.35			(27)
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**3.920**	**1.10**	4.31			(26)
Walls HALLWAY			22.62	0.13 (Ru=0.82)	3.02	70.00	1583.40	(29)
Walls EXTERNAL #WINDOWS & DOORS			36.50	0.15	5.47	70.00	2555.00	(29)
Party wall SOLID			16.69	0.00	0.00	180.00	3004.20	
Party floor ANOTHER DWELLING BELOW			76.96	0.00	0.00	40.00	3078.40	
Party ceiling ANOTHER DWELLING ABOVE			76.96	0.00	0.00	30.00	2308.80	

Total area of external elements Sigma A, m²	81.18	(31)
Fabric heat loss, W/K	31.92	(33)
Heat capacity	12529.80	(34)
Thermal mass parameter, kJ/m²K	162.81	(35)
Effect of thermal bridges	6.50	(36)
Total fabric heat loss	38.42	(37)

Ventilation heat loss calculated monthly

36.47	36.29	36.11	35.29	35.14	34.42	34.42	34.29	34.70	35.14	35.45	35.77	(38)

Heat transfer coefficient, W/K

74.89	74.71	74.53	73.71	73.56	72.84	72.84	72.71	73.12	73.56	73.87	74.20	
											73.71	(39)

Heat loss parameter (HLP), W/m²K

0.97	0.97	0.97	0.96	0.96	0.95	0.95	0.94	0.95	0.96	0.96	0.96	
HLP (average)											0.96	(40)

Number of days in month (Table 1a)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements **kWh/year**

Assumed occupancy, N 2.40 (42)

Annual average hot water usage in litres per day Vd,average 96.07 (43)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage in litres per day for each month												
105.67	101.83	97.99	94.14	90.30	86.46	86.46	90.30	94.14	97.99	101.83	105.67	(44)
Energy content of hot water used												
156.71	137.06	141.43	123.30	118.31	102.10	94.61	108.56	109.86	128.03	139.76	151.77	

Energy content (annual) 1511.50 (45)

Distribution loss

23.51	20.56	21.21	18.50	17.75	15.31	14.19	16.28	16.48	19.20	20.96	22.76	(46)

store loss determined from EN 13203-2 tests, taken from boiler data record

0.00 (50)

Hot water cylinder loss factor (kWh/day) 0.0000 (51)

Volume factor 0.0000 (52)

Temperature factor 0.0000 (53)

Energy lost from store (kWh/day) 0.00 (55)

Total storage loss

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(56)
Net storage loss												
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(57)
Primary loss												
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(59)
Combi loss calculated for each month												
26.47	23.89	26.39	25.45	26.24	25.33	26.13	26.20	25.40	26.33	25.56	26.45	(61)
Total heat required for water heating calculated for each month												
183.18	160.95	167.82	148.76	144.56	127.42	120.74	134.77	135.26	154.36	165.32	178.21	(62)
Output from water heater for each month, kWh/month												
183.18	160.95	167.82	148.76	144.56	127.42	120.74	134.77	135.26	154.36	165.32	178.21	(64)

1821.32 (64)

Heat gains from water heating, kWh/month

58.72	51.54	53.62	47.36	45.90	40.28	37.99	42.65	42.88	49.15	52.86	57.07	(65)

5. Internal gains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains, Watts												
144.16	144.16	144.16	144.16	144.16	144.16	144.16	144.16	144.16	144.16	144.16	144.16	(66)
Lighting gains												
47.47	42.16	34.29	25.96	19.40	16.38	17.70	23.01	30.88	39.21	45.76	48.79	(67)
Appliances gains												
317.87	321.16	312.85	295.16	272.82	251.83	237.80	234.50	242.81	260.51	282.85	303.84	(68)
Cooking gains												
51.82	51.82	51.82	51.82	51.82	51.82	51.82	51.82	51.82	51.82	51.82	51.82	(69)
Pumps and fans gains												
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	(70)
Losses e.g. evaporation (negative values)												
-96.11	-96.11	-96.11	-96.11	-96.11	-96.11	-96.11	-96.11	-96.11	-96.11	-96.11	-96.11	(71)
Water heating gains												
78.93	76.70	72.07	65.78	61.69	55.94	51.06	57.32	59.55	66.06	73.41	76.71	(72)
Total internal gains												
547.13	542.90	522.08	489.77	456.79	427.02	409.43	417.70	436.12	468.65	504.90	532.21	(73)

6. Solar gains (calculation for January)

	Area & Flux	g & FF	Shading	Gains	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 5.470	19.64	0.63 x 0.80	0.77	37.5231	
REAR						
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East)	0.9 x 12.670	19.64	0.63 x 0.80	0.77	86.9136	
FRONT						
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 3.920	19.64	0.63 x 0.80	0.77	26.8904	
REAR						
Total solar gains, January					151.33	(83-1)

Solar gains

151.33	296.03	487.52	711.01	871.37	892.00	849.23	729.47	567.00	351.26	188.69	124.44	(83)

Total gains

698.46	838.92	1009.60	1200.78	1328.16	1319.03	1258.66	1147.18	1003.12	819.92	693.58	656.65	(84)

Lighting calculations

	Area	g	FF x Shading	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 5.47	0.80	0.80 x 0.83	2.62
REAR				
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East)	0.9 x 12.67	0.80	0.80 x 0.83	6.06
FRONT				

7. Mean internal temperature

Temperature during heating periods in the living area, Th1 (°C) 21.00 (85)

Heating system responsiveness 1.00

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau											
46.48	46.59	46.70	47.22	47.32	47.78	47.78	47.87	47.60	47.32	47.12	46.91
alpha											
4.10	4.11	4.11	4.15	4.15	4.19	4.19	4.19	4.17	4.15	4.14	4.13
Utilisation factor for gains for living area											
0.96	0.92	0.83	0.67	0.50	0.35	0.25	0.29	0.49	0.78	0.93	0.97 (86)
Mean internal temperature in living area T1											
19.97	20.24	20.57	20.85	20.96	20.99	21.00	21.00	20.97	20.77	20.32	19.92 (87)
Temperature during heating periods in rest of dwelling Th2											
20.11	20.11	20.11	20.12	20.12	20.13	20.13	20.13	20.13	20.12	20.12	20.11 (88)
Utilisation factor for gains for rest of dwelling											
0.95	0.90	0.81	0.64	0.46	0.30	0.20	0.24	0.43	0.74	0.91	0.96 (89)
Mean internal temperature in the rest of dwelling T2											
18.76	19.13	19.59	19.95	20.08	20.12	20.13	20.13	20.10	19.87	19.26	18.69 (90)

Living area fraction (34.89 / 76.96) 0.45 (91)

Mean internal temperature (for the whole dwelling)

19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24 (92)

Apply adjustment to the mean internal temperature, where appropriate

19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24 (93)

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains											
0.94	0.90	0.80	0.65	0.47	0.32	0.23	0.26	0.46	0.75	0.90	0.95 (94)
Useful gains											
657.20	751.70	811.88	775.06	628.94	428.36	285.28	298.95	457.30	611.19	627.12	624.25 (95)
Monthly average external temperature											
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20 (96)
Heat loss rate for mean internal temperature											
1124.15	1100.70	1008.94	844.66	645.97	431.06	285.73	299.75	467.86	712.15	933.89	1116.22 (97)
Fraction of month for heating											
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
Space heating requirement for each month, kWh/month											
347.41	234.52	146.61	50.12	12.67	-	-	-	-	75.11	220.88	366.02

Total space heating requirement per year (kWh/year) (October to May) 1453.34 (98)

Space heating requirement per m² (kWh/m²/year) 18.88 (99)

8c. Space cooling requirement - not applicable

9a. Energy requirements

kWh/year

No secondary heating system selected

Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main heating system	93.20%	(206)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement												
347.41	234.52	146.61	50.12	12.67	-	-	-	-	75.11	220.88	366.02	(98)
Appendix Q - monthly energy saved (main heating system 1)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space heating fuel (main heating system 1)												
372.76	251.63	157.31	53.77	13.59	-	-	-	-	80.59	237.00	392.73	(211)
Appendix Q - monthly energy saved (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space heating fuel (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendix Q - monthly energy saved (secondary heating system)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space heating fuel (secondary)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water heating												
Water heating requirement												
183.18	160.95	167.82	148.76	144.56	127.42	120.74	134.77	135.26	154.36	165.32	178.21	(64)
Efficiency of water heater												87.30 (216)
89.18	89.00	88.63	88.01	87.53	87.30	87.30	87.30	87.30	88.23	88.94	89.23	(217)
Water heating fuel												
205.41	180.84	189.35	169.02	165.16	145.96	138.30	154.37	154.93	174.95	185.88	199.72	(219)

Annual totals	kWh/year	
Space heating fuel used, main system 1	1559.38	(211)
Space heating fuel (secondary)	0.00	(215)
Water heating fuel	2063.90	(219)
Electricity for pumps, fans and electric keep-hot		
central heating pump	30.00	(230c)
boiler with a fan-assisted flue	45.00	(230e)
Total electricity for the above, kWh/year	75.00	(231)
Electricity for lighting (100.00% fixed LEL)	335.31	(232)
Energy saving/generation technologies		
PVs 0.80 x 0.750 x 1079.525 x 1.000	647.715	
PVs 0.80 x 0.000 x 0.000 x 0.500	0.000	
PVs 0.80 x 0.000 x 0.000 x 0.500	0.000	
	647.715	(233)
Appendix Q -		
Energy saved or generated ():	0.000	(236a)
Energy used ():	0.000	(237a)
Total delivered energy for all uses	3385.87	(238)

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

10a. Fuel costs using Table 12 prices

	kWh/year	Fuel price p/kWh	£/year	
Space heating - main system 1	1559.377	3.480	54.27	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
Water heating cost	2063.90	3.480	71.82	(247)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	75.000	13.190	9.89	(249)
Energy for lighting	335.306	13.190	44.23	(250)
Additional standing charges			120.00	(251)
Electricity generated - PVs	647.715	13.190	-85.43	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			214.78	(255)

11a. SAP rating

	0.42	**(256)**
	0.74	**(257)**
SAP value	89.68	
	90	(258)
SAP band	**B**	

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating, main system 1	1559.38	0.216	336.83	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	2063.90	0.216	445.80	(264)
Space and water heating			782.63	(265)
Electricity for pumps and fans	75.00	0.519	38.93	(267)
Electricity for lighting	335.31	0.519	174.02	(268)
Electricity generated - PVs	-647.71	0.519	-336.16	(269)
Electricity generated - µCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			659.41	(272)

	kg/m²/year	
CO2 emissions per m²	**8.57**	(273)
EI value	92.75	(273a)
EI rating	**93**	(274)
EI band	**A**	

Calculation of stars for heating and DHW

Main heating energy efficiency	(3.48 / 0.9020) x (1 + (0.29 x 0.00)) = 3.8581, stars = 4
Main heating environmental impact	(0.2160 / 0.9020) x (1 + (0.29 x 0.00)) = 0.2395, stars = 4
Water heating energy efficiency	3.48 / 0.8816 = 3.9473, stars = 4
Water heating environmental impact	0.2160 / 0.8816 = 0.2450, stars = 4

Project Information
Building type Mid-floor flat

Reference
Date 8 January 2019
Email: none Project Flat 1
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England
assessed by program JPA Designer version 6.05.054, printed on 21/10/2021 at 22:21:14

New dwelling as designed

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1 TER and DER
Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate	TER = 16.20	
Dwelling Carbon Dioxide Emission Rate	DER = 9.87	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	TFEE = 41.3	
Dwelling Fabric Energy Efficiency (DFEE)	DFEE = 32.3	OK

2a Thermal bridging
Thermal bridging calculated from linear thermal transmittances for each junction

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2b Fabric U-values

Element	Average	Highest	
Wall	0.14 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.00 (max. 0.25)	0.00 (max. 0.70)	OK
Roof	0.00 (max. 0.20)	0.00 (max. 0.35)	OK
Openings	1.10 (max. 2.00)	1.10 (max. 3.30)	OK

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3 Air permeability

Air permeability at 50 pascals:	3.90	OK
Maximum :	10.00	

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4 Heating efficiency
Main heating system:
Boiler and underfloor heating, mains gas
Vaillant ecoFIT sustain 835
Source of efficiency: from boiler database
Vaillant ecoFIT sustain 835 VUW 356/6-3 (H-GB)
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0% OK
Secondary heating system:
None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley): OK

Slight OK

Based on:

Thermal mass parameter : 162.81

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.10 W/m²K

Walls U-value 0.13 W/m²K

Design air permeability 3.9 m³/h.m²

Photovoltaic array

Project Information

Building type Mid-floor flat

Reference

Date 8 January 2019

Email: none Project Flat 2
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m^2)	Av. Storey height (m)	Volume (m^3)	
Second floor	76.60	2.50	191.50	(3a)
	76.60			**(4)**
			191.50	**(5)**

2. Ventilation rate

	main + seondary + other heating		m³ per hour	
Number of chimneys	0 + 0 + 0	x 40	0.00	(6a)
Number of open flues	0 + 0 + 0	x 20	0.00	(6b)
Number of intermittent fans	3	x 10	30.00	(7a)
Number of passive vents	0	x 10	0.00	(7b)
Number of flueless gas fires	0	x 40	0.00	(7c)

		Air changes per hour	
		0.16	**(8)**
Pressure test, result q50	3.90		(17)
Air permeability		0.35	(18)
		2.00	**(19)**
		0.85	**(20)**
Infiltration rate incorporating shelter factor		0.30	(21)

Infiltration rate modified for monthly wind speed

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70

52.50 (22)

Wind Factor

1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18

13.13 (22a)

Adjusted infiltration rate (allowing for shelter and wind speed)

0.38	0.37	0.37	0.33	0.32	0.28	0.28	0.28	0.30	0.32	0.34	0.35

3.92 (22b)

Ventilation : natural ventilation, intermittent extract fans

Effective air change rate

0.57	0.57	0.57	0.55	0.55	0.54	0.54	0.54	0.54	0.55	0.56	0.56	(25)

3. Heat losses and heat loss parameter

Element	Gross area, m²	Openings m²	Net area A, m²	U-value W/m²K	A x U W/K	kappa-value kJ/m²K	A x K kJ/K	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**5.470**	**1.05 (1.10)**	5.76			(27)
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East) FRONT			**12.670**	**1.05 (1.10)**	13.35			(27)
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**3.920**	**1.10**	4.31			(26)
Walls HALLWAY			22.60	0.13 (Ru=0.82)	3.02	70.00	1582.00	(29)
Walls EXTERNAL #WINDOWS & DOORS			36.24	0.15	5.44	70.00	2536.80	(29)
Party wall SOLID			16.63	0.00	0.00	180.00	2993.40	
Party floor ANOTHER DWELLING BELOW			76.60	0.00	0.00	40.00	3064.00	
Party ceiling ANOTHER DWELLING ABOVE			76.60	0.00	0.00	30.00	2298.00	

Total area of external elements Sigma A, m²	80.90	(31)
Fabric heat loss, W/K	31.88	(33)
Heat capacity	12474.20	(34)
Thermal mass parameter, kJ/m²K	162.85	(35)
Effect of thermal bridges	6.50	(36)
Total fabric heat loss	38.38	(37)

Ventilation heat loss calculated monthly

36.19	36.01	35.83	35.01	34.86	34.15	34.15	34.01	34.42	34.86	35.17	35.50	(38)

Heat transfer coefficient, W/K

74.57	74.39	74.21	73.39	73.24	72.53	72.53	72.39	72.80	73.24	73.55	73.87	
											73.39	(39)

Heat loss parameter (HLP), W/m²K

0.97	0.97	0.97	0.96	0.96	0.95	0.95	0.95	0.95	0.96	0.96	0.96	
HLP (average)											0.96	(40)

Number of days in month (Table 1a)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements **kWh/year**

Assumed occupancy, N 2.40 (42)

Annual average hot water usage in litres per day Vd,average 95.88 (43)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hot water usage in litres per day for each month											
105.47	101.63	97.80	93.96	90.13	86.29	86.29	90.13	93.96	97.80	101.63	105.47 (44)
Energy content of hot water used											
156.41	136.79	141.16	123.07	118.08	101.90	94.42	108.35	109.65	127.78	139.48	151.47

Energy content (annual) 1508.56 (45)

Distribution loss

23.46	20.52	21.17	18.46	17.71	15.28	14.16	16.25	16.45	19.17	20.92	22.72 (46)

store loss determined from EN 13203-2 tests, taken from boiler data record

0.00 (50)

Hot water cylinder loss factor (kWh/day) 0.0000 (51)

Volume factor 0.0000 (52)

Temperature factor 0.0000 (53)

Energy lost from store (kWh/day) 0.00 (55)

Total storage loss

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00 (56)

Net storage loss

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00 (57)

Primary loss

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00 (59)

Combi loss calculated for each month

26.47	23.88	26.38	25.45	26.24	25.33	26.13	26.20	25.39	26.32	25.56	26.44 (61)

Total heat required for water heating calculated for each month

182.87	160.68	167.54	148.52	144.33	127.22	120.55	134.55	135.04	154.11	165.04	177.91 (62)

Output from water heater for each month, kWh/month

182.87	160.68	167.54	148.52	144.33	127.22	120.55	134.55	135.04	154.11	165.04	177.91 (64)

1818.37 (64)

Heat gains from water heating, kWh/month

58.62	51.45	53.53	47.28	45.82	40.21	37.93	42.58	42.81	49.07	52.77	56.97 (65)

5. Internal gains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains, Watts												
143.71	143.71	143.71	143.71	143.71	143.71	143.71	143.71	143.71	143.71	143.71	143.71	(66)
Lighting gains												
47.29	42.00	34.16	25.86	19.33	16.32	17.64	22.92	30.77	39.07	45.60	48.61	(67)
Appliances gains												
316.70	319.99	311.70	294.07	271.82	250.90	236.93	233.64	241.92	259.55	281.81	302.73	(68)
Cooking gains												
51.77	51.77	51.77	51.77	51.77	51.77	51.77	51.77	51.77	51.77	51.77	51.77	(69)
Pumps and fans gains												
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	(70)
Losses e.g. evaporation (negative values)												
-95.81	-95.81	-95.81	-95.81	-95.81	-95.81	-95.81	-95.81	-95.81	-95.81	-95.81	-95.81	(71)
Water heating gains												
78.79	76.57	71.95	65.67	61.59	55.85	50.98	57.23	59.45	65.95	73.29	76.58	(72)
Total internal gains												
545.45	541.23	520.48	488.27	455.41	425.74	408.21	416.46	434.81	467.24	503.36	530.58	(73)

6. Solar gains (calculation for January)

	Area & Flux	g & FF	Shading	Gains	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 5.470	19.64	0.63 x 0.80	0.77	37.5231	
REAR						
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East)	0.9 x 12.670	19.64	0.63 x 0.80	0.77	86.9136	
FRONT						
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 3.920	19.64	0.63 x 0.80	0.77	26.8904	
REAR						
Total solar gains, January					151.33	(83-1)

Solar gains

151.33	296.03	487.52	711.01	871.37	892.00	849.23	729.47	567.00	351.26	188.69	124.44	(83)

Total gains

696.78	837.26	1008.00	1199.29	1326.78	1317.75	1257.44	1145.93	1001.81	818.50	692.05	655.02	(84)

Lighting calculations

	Area	g	FF x Shading	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 5.47	0.80	0.80 x 0.83	2.62
REAR				
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East)	0.9 x 12.67	0.80	0.80 x 0.83	6.06
FRONT				

7. Mean internal temperature

Temperature during heating periods in the living area, Th1 (°C) 21.00 (85)

Heating system responsiveness 1.00

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau											
46.47	46.58	46.69	47.21	47.31	47.78	47.78	47.86	47.60	47.31	47.11	46.90
alpha											
4.10	4.11	4.11	4.15	4.15	4.19	4.19	4.19	4.17	4.15	4.14	4.13
Utilisation factor for gains for living area											
0.96	0.92	0.83	0.67	0.50	0.35	0.25	0.29	0.49	0.78	0.93	0.96 (86)
Mean internal temperature in living area T1											
19.98	20.24	20.57	20.85	20.96	20.99	21.00	21.00	20.97	20.77	20.32	19.92 (87)
Temperature during heating periods in rest of dwelling Th2											
20.11	20.11	20.11	20.12	20.12	20.13	20.13	20.13	20.12	20.12	20.12	20.11 (88)
Utilisation factor for gains for rest of dwelling											
0.95	0.90	0.81	0.63	0.45	0.30	0.20	0.24	0.43	0.74	0.91	0.96 (89)
Mean internal temperature in the rest of dwelling T2											
18.76	19.14	19.59	19.95	20.08	20.12	20.13	20.13	20.10	19.87	19.27	18.69 (90)

Living area fraction (34.62 / 76.60) 0.45 (91)

Mean internal temperature (for the whole dwelling)

19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24 (92)

Apply adjustment to the mean internal temperature, where appropriate

19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24 (93)

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains											
0.94	0.90	0.80	0.64	0.47	0.32	0.23	0.26	0.45	0.74	0.90	0.95 (94)
Useful gains											
655.38	749.69	809.50	772.27	626.33	426.42	283.94	297.55	455.34	609.15	625.35	622.52 (95)
Monthly average external temperature											
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20 (96)
Heat loss rate for mean internal temperature											
1119.35	1096.04	1004.67	840.99	643.09	429.07	284.38	298.34	465.73	709.05	929.88	1111.41 (97)
Fraction of month for heating											
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
Space heating requirement for each month, kWh/month											
345.19	232.75	145.21	49.47	12.47	-	-	-	-	74.32	219.26	363.74

Total space heating requirement per year (kWh/year) (October to May) 1442.41 (98)

Space heating requirement per m² (kWh/m²/year) 18.83 (99)

8c. Space cooling requirement - not applicable

9a. Energy requirements

kWh/year

No secondary heating system selected

Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main heating system	93.20%	(206)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement												
345.19	232.75	145.21	49.47	12.47	-	-	-	-	74.32	219.26	363.74	(98)
Appendix Q - monthly energy saved (main heating system 1)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space heating fuel (main heating system 1)												
370.38	249.73	155.80	53.08	13.38	-	-	-	-	79.74	235.26	390.28	(211)
Appendix Q - monthly energy saved (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space heating fuel (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendix Q - monthly energy saved (secondary heating system)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space heating fuel (secondary)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water heating												
Water heating requirement												
182.87	160.68	167.54	148.52	144.33	127.22	120.55	134.55	135.04	154.11	165.04	177.91	(64)
Efficiency of water heater												87.30 (216)
89.17	88.99	88.62	88.01	87.52	87.30	87.30	87.30	87.30	88.22	88.93	89.23	(217)
Water heating fuel												
205.07	180.55	189.05	168.76	164.90	145.73	138.09	154.13	154.69	174.68	185.58	199.40	(219)

Annual totals	kWh/year	
Space heating fuel used, main system 1	1547.65	(211)
Space heating fuel (secondary)	0.00	(215)
Water heating fuel	2060.62	(219)
Electricity for pumps, fans and electric keep-hot		
central heating pump	30.00	(230c)
boiler with a fan-assisted flue	45.00	(230e)
Total electricity for the above, kWh/year	75.00	(231)
Electricity for lighting (100.00% fixed LEL)	334.08	(232)
Energy saving/generation technologies		
Appendix Q -		
Energy saved or generated ():	0.000	(236a)
Energy used ():	0.000	(237a)
Total delivered energy for all uses	4017.35	(238)

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

10a. Fuel costs using Table 12 prices

	kWh/year	Fuel price p/kWh	£/year	
Space heating - main system 1	1547.651	3.480	53.86	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
Water heating cost	2060.62	3.480	71.71	(247)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	75.000	13.190	9.89	(249)
Energy for lighting	334.075	13.190	44.06	(250)
Additional standing charges			120.00	(251)
Electricity generated - PVs	0.000	0.000	0.00	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			299.52	(255)

11a. SAP rating

	0.42	**(256)**
	1.03	**(257)**
SAP value	85.57	
	86	(258)
SAP band	**B**	

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating, main system 1	1547.65	0.216	334.29	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	2060.62	0.216	445.09	(264)
Space and water heating			779.39	(265)
Electricity for pumps and fans	75.00	0.519	38.93	(267)
Electricity for lighting	334.08	0.519	173.39	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - µCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			991.70	(272)

	kg/m²/year	
CO2 emissions per m²	**12.95**	(273)
EI value	89.07	(273a)
EI rating	**89**	(274)
EI band	**B**	

Calculation of stars for heating and DHW

Main heating energy efficiency	(3.48 / 0.9020) x (1 + (0.29 x 0.00)) = 3.8581, stars = 4
Main heating environmental impact	(0.2160 / 0.9020) x (1 + (0.29 x 0.00)) = 0.2395, stars = 4
Water heating energy efficiency	3.48 / 0.8816 = 3.9474, stars = 4
Water heating environmental impact	0.2160 / 0.8816 = 0.2450, stars = 4

Project Information
Building type Mid-floor flat

Reference
Date 8 January 2019
Email: none Project Flat 2
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England
assessed by program JPA Designer version 6.05.054, printed on 21/10/2021 at 22:21:14

New dwelling as designed

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1 TER and DER
Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate	TER = 16.20	
Dwelling Carbon Dioxide Emission Rate	DER = 14.25	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	TFEE = 41.2	
Dwelling Fabric Energy Efficiency (DFEE)	DFEE = 32.3	OK

2a Thermal bridging
Thermal bridging calculated from linear thermal transmittances for each junction

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2b Fabric U-values

Element	Average	Highest	
Wall	0.14 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.00 (max. 0.25)	0.00 (max. 0.70)	OK
Roof	0.00 (max. 0.20)	0.00 (max. 0.35)	OK
Openings	1.10 (max. 2.00)	1.10 (max. 3.30)	OK

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3 Air permeability

Air permeability at 50 pascals:	3.90	OK
Maximum :	10.00	

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4 Heating efficiency
Main heating system:
Boiler and underfloor heating, mains gas
Vaillant ecoFIT sustain 835
Source of efficiency: from boiler database
Vaillant ecoFIT sustain 835 VUW 356/6-3 (H-GB)
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0% OK
Secondary heating system:
None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley): OK

Medium OK

Based on:

Thermal mass parameter : 162.85

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.10 W/m²K

Walls U-value 0.13 W/m²K

Design air permeability 3.9 m³/h.m²

Project Information

Building type Mid-floor flat

Reference

Date 8 January 2019

Email: none Project Flat 2
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m^2)	Av. Storey height (m)	Volume (m^3)	
Second floor	76.60	2.50	191.50	(3a)
	76.60			**(4)**
			191.50	**(5)**

2. Ventilation rate

	main + seondary + other heating		m³ per hour	
Number of chimneys	0 + 0 + 0	x 40	0.00	(6a)
Number of open flues	0 + 0 + 0	x 20	0.00	(6b)
Number of intermittent fans	3	x 10	30.00	(7a)
Number of passive vents	0	x 10	0.00	(7b)
Number of flueless gas fires	0	x 40	0.00	(7c)

		Air changes per hour	
		0.16	**(8)**
Pressure test, result q50	3.90		(17)
Air permeability		0.35	(18)
		2.00	**(19)**
		0.85	**(20)**
Infiltration rate incorporating shelter factor		0.30	(21)

Infiltration rate modified for monthly wind speed

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70

52.50 (22)

Wind Factor

1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18

13.13 (22a)

Adjusted infiltration rate (allowing for shelter and wind speed)

0.38	0.37	0.37	0.33	0.32	0.28	0.28	0.28	0.30	0.32	0.34	0.35

3.92 (22b)

Ventilation : natural ventilation, intermittent extract fans

Effective air change rate

0.57	0.57	0.57	0.55	0.55	0.54	0.54	0.54	0.54	0.55	0.56	0.56	(25)

3. Heat losses and heat loss parameter

Element	Gross area, m²	Openings m²	Net area A, m²	U-value W/m²K	A x U W/K	kappa-value kJ/m²K	A x K kJ/K	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East) FRONT			**12.670**	**1.05 (1.10)**	13.35			(27)
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**5.470**	**1.05 (1.10)**	5.76			(27)
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**3.920**	**1.10**	4.31			(26)
Walls HALLWAY			22.60	0.13 (Ru=0.82)	3.02	70.00	1582.00	(29)
Walls EXTERNAL #WINDOWS & DOORS			36.24	0.15	5.44	70.00	2536.80	(29)
Party wall SOLID			16.63	0.00	0.00	180.00	2993.40	
Party floor ANOTHER DWELLING BELOW			76.60	0.00	0.00	40.00	3064.00	
Party ceiling ANOTHER DWELLING ABOVE			76.60	0.00	0.00	30.00	2298.00	

Total area of external elements Sigma A, m²	80.90	(31)
Fabric heat loss, W/K	31.88	(33)
Heat capacity	12474.20	(34)
Thermal mass parameter, kJ/m²K	162.85	(35)
Effect of thermal bridges	6.50	(36)
Total fabric heat loss	38.38	(37)

Ventilation heat loss calculated monthly

36.19	36.01	35.83	35.01	34.86	34.15	34.15	34.01	34.42	34.86	35.17	35.50	(38)

Heat transfer coefficient, W/K

74.57	74.39	74.21	73.39	73.24	72.53	72.53	72.39	72.80	73.24	73.55	73.87	
											73.39	(39)

Heat loss parameter (HLP), W/m²K

0.97	0.97	0.97	0.96	0.96	0.95	0.95	0.95	0.95	0.96	0.96	0.96	
HLP (average)											0.96	(40)

Number of days in month (Table 1a)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements **kWh/year**

Assumed occupancy, N 2.40 (42)

Annual average hot water usage in litres per day Vd,average 95.88 (43)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hot water usage in litres per day for each month											
105.47	101.63	97.80	93.96	90.13	86.29	86.29	90.13	93.96	97.80	101.63	105.47 (44)
Energy content of hot water used											
156.41	136.79	141.16	123.07	118.08	101.90	94.42	108.35	109.65	127.78	139.48	151.47

Energy content (annual) 1508.56 (45)

Distribution loss

23.46	20.52	21.17	18.46	17.71	15.28	14.16	16.25	16.45	19.17	20.92	22.72 (46)

store loss determined from EN 13203-2 tests, taken from boiler data record

0.00 (50)

Hot water cylinder loss factor (kWh/day) 0.0000 (51)

Volume factor 0.0000 (52)

Temperature factor 0.0000 (53)

Energy lost from store (kWh/day) 0.00 (55)

Total storage loss

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00 (56)

Net storage loss

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00 (57)

Primary loss

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00 (59)

Combi loss calculated for each month

26.47	23.88	26.38	25.45	26.24	25.33	26.13	26.20	25.39	26.32	25.56	26.44 (61)

Total heat required for water heating calculated for each month

182.87	160.68	167.54	148.52	144.33	127.22	120.55	134.55	135.04	154.11	165.04	177.91 (62)

Output from water heater for each month, kWh/month

182.87	160.68	167.54	148.52	144.33	127.22	120.55	134.55	135.04	154.11	165.04	177.91 (64)

1818.37 (64)

Heat gains from water heating, kWh/month

58.62	51.45	53.53	47.28	45.82	40.21	37.93	42.58	42.81	49.07	52.77	56.97 (65)

5. Internal gains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains, Watts												
143.71	143.71	143.71	143.71	143.71	143.71	143.71	143.71	143.71	143.71	143.71	143.71	(66)
Lighting gains												
47.29	42.00	34.16	25.86	19.33	16.32	17.64	22.92	30.77	39.07	45.60	48.61	(67)
Appliances gains												
316.70	319.99	311.70	294.07	271.82	250.90	236.93	233.64	241.92	259.55	281.81	302.73	(68)
Cooking gains												
51.77	51.77	51.77	51.77	51.77	51.77	51.77	51.77	51.77	51.77	51.77	51.77	(69)
Pumps and fans gains												
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	(70)
Losses e.g. evaporation (negative values)												
-95.81	-95.81	-95.81	-95.81	-95.81	-95.81	-95.81	-95.81	-95.81	-95.81	-95.81	-95.81	(71)
Water heating gains												
78.79	76.57	71.95	65.67	61.59	55.85	50.98	57.23	59.45	65.95	73.29	76.58	(72)
Total internal gains												
545.45	541.23	520.48	488.27	455.41	425.74	408.21	416.46	434.81	467.24	503.36	530.58	(73)

6. Solar gains (calculation for January)

	Area & Flux	g & FF	Shading	Gains	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East) FRONT	0.9 x 12.670	19.64 0.63 x 0.80	0.77	86.9136	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR	0.9 x 5.470	19.64 0.63 x 0.80	0.77	37.5231	
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR	0.9 x 3.920	19.64 0.63 x 0.80	0.77	26.8904	
Total solar gains, January				151.33	(83-1)

Solar gains

151.33	296.03	487.52	711.01	871.37	892.00	849.23	729.47	567.00	351.26	188.69	124.44	(83)

Total gains

696.78	837.26	1008.00	1199.29	1326.78	1317.75	1257.44	1145.93	1001.81	818.50	692.05	655.02	(84)

Lighting calculations

	Area	g	FF x Shading	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East) FRONT	0.9 x 12.67	0.80	0.80 x 0.83	6.06
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR	0.9 x 5.47	0.80	0.80 x 0.83	2.62

7. Mean internal temperature

Temperature during heating periods in the living area, Th1 (°C) 21.00 (85)

Heating system responsiveness 1.00

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau											
46.47	46.58	46.69	47.21	47.31	47.78	47.78	47.86	47.60	47.31	47.11	46.90
alpha											
4.10	4.11	4.11	4.15	4.15	4.19	4.19	4.19	4.17	4.15	4.14	4.13
Utilisation factor for gains for living area											
0.96	0.92	0.83	0.67	0.50	0.35	0.25	0.29	0.49	0.78	0.93	0.96 (86)
Mean internal temperature in living area T1											
19.98	20.24	20.57	20.85	20.96	20.99	21.00	21.00	20.97	20.77	20.32	19.92 (87)
Temperature during heating periods in rest of dwelling Th2											
20.11	20.11	20.11	20.12	20.12	20.13	20.13	20.13	20.12	20.12	20.12	20.11 (88)
Utilisation factor for gains for rest of dwelling											
0.95	0.90	0.81	0.63	0.45	0.30	0.20	0.24	0.43	0.74	0.91	0.96 (89)
Mean internal temperature in the rest of dwelling T2											
18.76	19.14	19.59	19.95	20.08	20.12	20.13	20.13	20.10	19.87	19.27	18.69 (90)

Living area fraction (34.62 / 76.60) 0.45 (91)

Mean internal temperature (for the whole dwelling)

19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24 (92)

Apply adjustment to the mean internal temperature, where appropriate

19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24 (93)

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains											
0.94	0.90	0.80	0.64	0.47	0.32	0.23	0.26	0.45	0.74	0.90	0.95 (94)
Useful gains											
655.38	749.69	809.50	772.27	626.33	426.42	283.94	297.55	455.34	609.15	625.35	622.52 (95)
Monthly average external temperature											
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20 (96)
Heat loss rate for mean internal temperature											
1119.35	1096.04	1004.67	840.99	643.09	429.07	284.38	298.34	465.73	709.05	929.88	1111.41 (97)
Fraction of month for heating											
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
Space heating requirement for each month, kWh/month											
345.19	232.75	145.21	49.47	12.47	-	-	-	-	74.32	219.26	363.74

Total space heating requirement per year (kWh/year) (October to May) 1442.41 (98)

Space heating requirement per m² (kWh/m²/year) 18.83 (99)

8c. Space cooling requirement - not applicable

9a. Energy requirements

kWh/year

No secondary heating system selected

Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main heating system	93.20%	(206)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement												
345.19	232.75	145.21	49.47	12.47	-	-	-	-	74.32	219.26	363.74	(98)
Appendix Q - monthly energy saved (main heating system 1)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space heating fuel (main heating system 1)												
370.38	249.73	155.80	53.08	13.38	-	-	-	-	79.74	235.26	390.28	(211)
Appendix Q - monthly energy saved (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space heating fuel (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendix Q - monthly energy saved (secondary heating system)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space heating fuel (secondary)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water heating												
Water heating requirement												
182.87	160.68	167.54	148.52	144.33	127.22	120.55	134.55	135.04	154.11	165.04	177.91	(64)
Efficiency of water heater												87.30 (216)
89.17	88.99	88.62	88.01	87.52	87.30	87.30	87.30	87.30	88.22	88.93	89.23	(217)
Water heating fuel												
205.07	180.55	189.05	168.76	164.90	145.73	138.09	154.13	154.69	174.68	185.58	199.40	(219)

Annual totals	kWh/year	
Space heating fuel used, main system 1	1547.65	(211)
Space heating fuel (secondary)	0.00	(215)
Water heating fuel	2060.62	(219)
Electricity for pumps, fans and electric keep-hot		
central heating pump	30.00	(230c)
boiler with a fan-assisted flue	45.00	(230e)
Total electricity for the above, kWh/year	75.00	(231)
Electricity for lighting (100.00% fixed LEL)	334.08	(232)
Energy saving/generation technologies		
PVs 0.80 x 0.750 x 1079.525 x 1.000	647.715	
PVs 0.80 x 0.000 x 0.000 x 0.500	0.000	
PVs 0.80 x 0.000 x 0.000 x 0.500	0.000	
	647.715	(233)
Appendix Q -		
Energy saved or generated ():	0.000	(236a)
Energy used ():	0.000	(237a)
Total delivered energy for all uses	3369.63	(238)

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

10a. Fuel costs using Table 12 prices

	kWh/year	Fuel price p/kWh	£/year	
Space heating - main system 1	1547.651	3.480	53.86	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
Water heating cost	2060.62	3.480	71.71	(247)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	75.000	13.190	9.89	(249)
Energy for lighting	334.075	13.190	44.06	(250)
Additional standing charges			120.00	(251)
Electricity generated - PVs	647.715	13.190	-85.43	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			214.09	(255)

11a. SAP rating

	0.42	**(256)**
	0.74	**(257)**
SAP value	89.68	
	90	(258)
SAP band	**B**	

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating, main system 1	1547.65	0.216	334.29	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	2060.62	0.216	445.09	(264)
Space and water heating			779.39	(265)
Electricity for pumps and fans	75.00	0.519	38.93	(267)
Electricity for lighting	334.08	0.519	173.39	(268)
Electricity generated - PVs	-647.71	0.519	-336.16	(269)
Electricity generated - µCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			655.53	(272)

	kg/m²/year	
CO2 emissions per m²	**8.56**	(273)
EI value	92.78	(273a)
EI rating	**93**	(274)
EI band	**A**	

Calculation of stars for heating and DHW

Main heating energy efficiency	(3.48 / 0.9020) x (1 + (0.29 x 0.00)) = 3.8581, stars = 4
Main heating environmental impact	(0.2160 / 0.9020) x (1 + (0.29 x 0.00)) = 0.2395, stars = 4
Water heating energy efficiency	3.48 / 0.8816 = 3.9474, stars = 4
Water heating environmental impact	0.2160 / 0.8816 = 0.2450, stars = 4

Project Information
Building type Mid-floor flat

Reference
Date 8 January 2019
Email: none Project Flat 2
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England
assessed by program JPA Designer version 6.05.054, printed on 21/10/2021 at 22:21:13

New dwelling as designed

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1 TER and DER
Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate	TER = n/a	
Dwelling Carbon Dioxide Emission Rate	DER = 9.86	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	TFEE = 41.2	
Dwelling Fabric Energy Efficiency (DFEE)	DFEE = n/a	OK

2a Thermal bridging
Thermal bridging calculated from linear thermal transmittances for each junction

---

2b Fabric U-values

Element	Average	Highest	
Wall	0.14 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.00 (max. 0.25)	0.00 (max. 0.70)	OK
Roof	0.00 (max. 0.20)	0.00 (max. 0.35)	OK
Openings	1.10 (max. 2.00)	1.10 (max. 3.30)	OK

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3 Air permeability

Air permeability at 50 pascals:	3.90	OK
Maximum :	10.00	

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4 Heating efficiency
Main heating system:
Boiler and underfloor heating, mains gas
Vaillant ecoFIT sustain 835
Source of efficiency: from boiler database
Vaillant ecoFIT sustain 835 VUW 356/6-3 (H-GB)
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0% OK
Secondary heating system:
None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley): OK

Medium OK

Based on:

Thermal mass parameter : 162.85

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.10 W/m²K

Walls U-value 0.13 W/m²K

Design air permeability 3.9 m³/h.m²

Photovoltaic array

Project Information

Building type Top-floor flat

Reference

Date 8 January 2019

Email: none Project Flat 3
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m^2)	Av. Storey height (m)	Volume (m^3)	
Third floor	76.92	2.77	213.07	(3a)
	76.92			**(4)**
			213.07	**(5)**

2. Ventilation rate

			m³ per hour	
	main + seondary + other heating			
Number of chimneys	0 + 0 + 0	x 40	0.00	(6a)
Number of open flues	0 + 0 + 0	x 20	0.00	(6b)
Number of intermittent fans	3	x 10	30.00	(7a)
Number of passive vents	0	x 10	0.00	(7b)
Number of flueless gas fires	0	x 40	0.00	(7c)

		Air changes per hour	
		0.14	**(8)**
Pressure test, result q50	3.90		(17)
Air permeability		0.34	(18)
		2.00	**(19)**
		0.85	**(20)**
Infiltration rate incorporating shelter factor		0.29	(21)

Infiltration rate modified for monthly wind speed

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70

52.50 (22)

Wind Factor

1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18

13.13 (22a)

Adjusted infiltration rate (allowing for shelter and wind speed)

0.36	0.36	0.35	0.31	0.31	0.27	0.27	0.26	0.29	0.31	0.32	0.34

3.75 (22b)

Ventilation : natural ventilation, intermittent extract fans

Effective air change rate

0.57	0.56	0.56	0.55	0.55	0.54	0.54	0.53	0.54	0.55	0.55	0.56	(25)

3. Heat losses and heat loss parameter

Element	Gross area, m²	Openings m²	Net area A, m²	U-value W/m²K	A x U W/K	kappa-value kJ/m²K	A x K kJ/K	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East) FRONT			**12.670**	**1.05 (1.10)**	13.35			(27)
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**5.470**	**1.05 (1.10)**	5.76			(27)
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**3.920**	**1.10**	4.31			(26)
Walls HALLWAY			24.96	0.13 (Ru=0.85)	3.32	70.00	1747.20	(29)
Walls EXTERNAL #WINDOWS & DOORS			42.56	0.15	6.38	70.00	2979.20	(29)
Flat roofs MAIN ROOF			10.72	0.13	1.39	9.00	96.48	(30)
Party wall SOLID			18.42	0.00	0.00	180.00	3315.60	
Party floor ANOTHER DWELLING BELOW			76.92	0.00	0.00	40.00	3076.80	
Party ceiling ANOTHER DWELLING ABOVE			66.20	0.00	0.00	30.00	1986.00	

Total area of external elements Sigma A, m²	100.30	(31)
Fabric heat loss, W/K	34.52	(33)
Heat capacity	13201.28	(34)
Thermal mass parameter, kJ/m²K	171.62	(35)
Effect of thermal bridges	13.30	(36)
Total fabric heat loss	47.82	(37)

Ventilation heat loss calculated monthly

39.81	39.63	39.45	38.62	38.47	37.74	37.74	37.61	38.02	38.47	38.78	39.11	(38)

Heat transfer coefficient, W/K

87.64	87.45	87.28	86.45	86.29	85.56	85.56	85.43	85.84	86.29	86.60	86.93	
											86.44	(39)

Heat loss parameter (HLP), W/m²K

1.14	1.14	1.13	1.12	1.12	1.11	1.11	1.11	1.12	1.12	1.13	1.13	

HLP (average) 1.12 (40)

Number of days in month (Table 1a)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements **kWh/year**

Assumed occupancy, N 2.40 (42)

Annual average hot water usage in litres per day Vd,average 96.05 (43)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage in litres per day for each month												
105.65	101.81	97.97	94.12	90.28	86.44	86.44	90.28	94.12	97.97	101.81	105.65	(44)
Energy content of hot water used												
156.68	137.03	141.40	123.28	118.29	102.07	94.59	108.54	109.84	128.00	139.73	151.73	

Energy content (annual) 1511.17 (45)

Distribution loss

23.50	20.55	21.21	18.49	17.74	15.31	14.19	16.28	16.48	19.20	20.96	22.76	(46)

store loss determined from EN 13203-2 tests, taken from boiler data record

0.00 (50)

Hot water cylinder loss factor (kWh/day) 0.0000 (51)

Volume factor 0.0000 (52)

Temperature factor 0.0000 (53)

Energy lost from store (kWh/day) 0.00 (55)

Total storage loss

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(56)
Net storage loss												
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(57)
Primary loss												
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(59)
Combi loss calculated for each month												
26.47	23.89	26.39	25.45	26.24	25.33	26.13	26.20	25.40	26.33	25.56	26.45	(61)
Total heat required for water heating calculated for each month												
183.14	160.92	167.79	148.73	144.53	127.40	120.72	134.74	135.23	154.33	165.29	178.18	(62)
Output from water heater for each month, kWh/month												
183.14	160.92	167.79	148.73	144.53	127.40	120.72	134.74	135.23	154.33	165.29	178.18	(64)

1821.00 (64)

Heat gains from water heating, kWh/month

58.71	51.53	53.61	47.35	45.89	40.27	37.98	42.64	42.87	49.14	52.85	57.06	(65)

5. Internal gains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains, Watts												
144.11	144.11	144.11	144.11	144.11	144.11	144.11	144.11	144.11	144.11	144.11	144.11	(66)
Lighting gains												
47.45	42.14	34.27	25.95	19.40	16.37	17.69	23.00	30.87	39.19	45.74	48.77	(67)
Appliances gains												
317.74	321.03	312.72	295.04	272.71	251.72	237.70	234.41	242.72	260.40	282.73	303.72	(68)
Cooking gains												
51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	(69)
Pumps and fans gains												
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	(70)
Losses e.g. evaporation (negative values)												
-96.07	-96.07	-96.07	-96.07	-96.07	-96.07	-96.07	-96.07	-96.07	-96.07	-96.07	-96.07	(71)
Water heating gains												
78.91	76.69	72.06	65.77	61.68	55.93	51.05	57.31	59.54	66.05	73.40	76.70	(72)
Total internal gains												
546.95	542.71	521.91	489.60	456.64	426.88	409.30	417.57	435.97	468.50	504.73	532.03	(73)

6. Solar gains (calculation for January)

	Area & Flux	g & FF	Shading	Gains	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East)	0.9 x 12.670	19.64	0.63 x 0.80	0.77	86.9136	
FRONT						
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 5.470	19.64	0.63 x 0.80	0.77	37.5231	
REAR						
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 3.920	19.64	0.63 x 0.80	0.77	26.8904	
REAR						
Total solar gains, January					151.33	(83-1)

Solar gains

151.33	296.03	487.52	711.01	871.37	892.00	849.23	729.47	567.00	351.26	188.69	124.44	(83)

Total gains

698.27	838.74	1009.42	1200.61	1328.01	1318.88	1258.52	1147.04	1002.97	819.76	693.41	656.47	(84)

Lighting calculations

	Area	g	FF x Shading	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East)	0.9 x 12.67	0.80	0.80 x 0.83	6.06
FRONT				
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 5.47	0.80	0.80 x 0.83	2.62
REAR				

7. Mean internal temperature

Temperature during heating periods in the living area, Th1 (°C) 21.00 (85)

Heating system responsiveness 1.00

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau											
41.84	41.93	42.02	42.42	42.50	42.86	42.86	42.92	42.72	42.50	42.34	42.18
alpha											
3.79	3.80	3.80	3.83	3.83	3.86	3.86	3.86	3.85	3.83	3.82	3.81
Utilisation factor for gains for living area											
0.97	0.94	0.87	0.74	0.57	0.41	0.30	0.34	0.56	0.83	0.94	0.97 (86)
Mean internal temperature in living area T1											
19.72	19.99	20.37	20.73	20.92	20.98	21.00	20.99	20.94	20.64	20.10	19.66 (87)
Temperature during heating periods in rest of dwelling Th2											
19.97	19.97	19.97	19.98	19.98	19.99	19.99	19.99	19.99	19.98	19.98	19.98 (88)
Utilisation factor for gains for rest of dwelling											
0.96	0.93	0.85	0.70	0.51	0.35	0.23	0.27	0.49	0.79	0.93	0.97 (89)
Mean internal temperature in the rest of dwelling T2											
18.29	18.68	19.21	19.69	19.91	19.98	19.99	19.99	19.94	19.59	18.86	18.22 (90)

Living area fraction (34.67 / 76.92) 0.45 (91)

Mean internal temperature (for the whole dwelling)

18.94	19.27	19.73	20.16	20.36	20.43	20.44	20.44	20.39	20.06	19.42	18.87 (92)

Apply adjustment to the mean internal temperature, where appropriate

18.94	19.27	19.73	20.16	20.36	20.43	20.44	20.44	20.39	20.06	19.42	18.87 (93)

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains											
0.95	0.92	0.84	0.70	0.53	0.37	0.26	0.30	0.51	0.79	0.92	0.96 (94)
Useful gains											
664.69	768.51	849.30	843.74	708.94	491.53	327.43	342.92	516.02	648.94	639.97	630.04 (95)
Monthly average external temperature											
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20 (96)
Heat loss rate for mean internal temperature											
1282.63	1256.71	1154.83	973.26	747.42	498.90	328.80	345.27	540.29	816.72	1066.89	1275.11 (97)
Fraction of month for heating											
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
Space heating requirement for each month, kWh/month											
459.75	328.07	227.32	93.25	28.63	-	-	-	-	124.83	307.38	479.93

Total space heating requirement per year (kWh/year) (October to May) 2049.15 (98)

Space heating requirement per m² (kWh/m²/year) 26.64 (99)

8c. Space cooling requirement - not applicable

9a. Energy requirements

kWh/year

No secondary heating system selected

Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main heating system	93.20%	(206)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement												
459.75	328.07	227.32	93.25	28.63	-	-	-	-	124.83	307.38	479.93	(98)
Appendix Q - monthly energy saved (main heating system 1)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space heating fuel (main heating system 1)												
493.29	352.00	243.90	100.05	30.72	-	-	-	-	133.94	329.81	514.95	(211)
Appendix Q - monthly energy saved (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space heating fuel (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendix Q - monthly energy saved (secondary heating system)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space heating fuel (secondary)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water heating												
Water heating requirement												
183.14	160.92	167.79	148.73	144.53	127.40	120.72	134.74	135.23	154.33	165.29	178.18	(64)
Efficiency of water heater												87.30 (216)
89.35	89.22	88.95	88.40	87.77	87.30	87.30	87.30	87.30	88.57	89.16	89.40	(217)
Water heating fuel												
204.96	180.35	188.64	168.26	164.68	145.94	138.28	154.34	154.90	174.24	185.37	199.31	(219)

Annual totals	kWh/year	
Space heating fuel used, main system 1	2198.66	(211)
Space heating fuel (secondary)	0.00	(215)
Water heating fuel	2059.27	(219)
Electricity for pumps, fans and electric keep-hot		
central heating pump	30.00	(230c)
boiler with a fan-assisted flue	45.00	(230e)
Total electricity for the above, kWh/year	75.00	(231)
Electricity for lighting (100.00% fixed LEL)	335.17	(232)
Energy saving/generation technologies		
Appendix Q -		
Energy saved or generated ():	0.000	(236a)
Energy used ():	0.000	(237a)
Total delivered energy for all uses	4668.10	(238)

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

10a. Fuel costs using Table 12 prices

	kWh/year	Fuel price p/kWh	£/year	
Space heating - main system 1	2198.657	3.480	76.51	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
Water heating cost	2059.27	3.480	71.66	(247)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	75.000	13.190	9.89	(249)
Energy for lighting	335.170	13.190	44.21	(250)
Additional standing charges			120.00	(251)
Electricity generated - PVs	0.000	0.000	0.00	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			322.28	(255)

11a. SAP rating

	0.42	**(256)**
	1.11	**(257)**
SAP value	84.51	
	85	(258)
SAP band	**B**	

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating, main system 1	2198.66	0.216	474.91	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	2059.27	0.216	444.80	(264)
Space and water heating			919.71	(265)
Electricity for pumps and fans	75.00	0.519	38.93	(267)
Electricity for lighting	335.17	0.519	173.95	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - µCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			1132.59	(272)

	kg/m²/year	
CO2 emissions per m²	**14.72**	(273)
EI value	87.55	(273a)
EI rating	**88**	(274)
EI band	**B**	

Calculation of stars for heating and DHW

Main heating energy efficiency	(3.48 / 0.9020) x (1 + (0.29 x 0.00)) = 3.8581, stars = 4
Main heating environmental impact	(0.2160 / 0.9020) x (1 + (0.29 x 0.00)) = 0.2395, stars = 4
Water heating energy efficiency	3.48 / 0.8833 = 3.9395, stars = 4
Water heating environmental impact	0.2160 / 0.8833 = 0.2445, stars = 4

Project Information
Building type Top-floor flat

Reference
Date 8 January 2019
Email: none Project Flat 3
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England
assessed by program JPA Designer version 6.05.054, printed on 21/10/2021 at 22:21:13

New dwelling as designed

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1 TER and DER
Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate	TER = 17.38	
Dwelling Carbon Dioxide Emission Rate	DER = 16.15	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	TFEE = 47.2	
Dwelling Fabric Energy Efficiency (DFEE)	DFEE = 40.5	OK

2a Thermal bridging
Thermal bridging calculated from linear thermal transmittances for each junction

---

2b Fabric U-values

Element	Average	Highest	
Wall	0.14 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.00 (max. 0.25)	0.00 (max. 0.70)	OK
Roof	0.13 (max. 0.20)	0.13 (max. 0.35)	OK
Openings	1.10 (max. 2.00)	1.10 (max. 3.30)	OK

---

3 Air permeability

Air permeability at 50 pascals:	3.90	OK
Maximum :	10.00	

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4 Heating efficiency
Main heating system:
Boiler and underfloor heating, mains gas
Vaillant ecoFIT sustain 835
Source of efficiency: from boiler database
Vaillant ecoFIT sustain 835 VUW 356/6-3 (H-GB)
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0% OK
Secondary heating system:
None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley): OK

Slight OK

Based on:

Thermal mass parameter : 171.62

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.10 W/m²K

Walls U-value 0.13 W/m²K

Design air permeability 3.9 m³/h.m²

Project Information

Building type Top-floor flat

Reference

Date 8 January 2019

Email: none Project Flat 3
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m^2)	Av. Storey height (m)	Volume (m^3)	
Third floor	76.92	2.77	213.07	(3a)
	76.92			**(4)**
			213.07	**(5)**

2. Ventilation rate

			m³ per hour	
	main + seondary + other heating			
Number of chimneys	0 + 0 + 0	x 40	0.00	(6a)
Number of open flues	0 + 0 + 0	x 20	0.00	(6b)
Number of intermittent fans	3	x 10	30.00	(7a)
Number of passive vents	0	x 10	0.00	(7b)
Number of flueless gas fires	0	x 40	0.00	(7c)

		Air changes per hour	
		0.14	**(8)**
Pressure test, result q50	3.90		(17)
Air permeability		0.34	(18)
		2.00	**(19)**
		0.85	**(20)**
Infiltration rate incorporating shelter factor		0.29	(21)

Infiltration rate modified for monthly wind speed

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70

52.50 (22)

Wind Factor

1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18

13.13 (22a)

Adjusted infiltration rate (allowing for shelter and wind speed)

0.36	0.36	0.35	0.31	0.31	0.27	0.27	0.26	0.29	0.31	0.32	0.34

3.75 (22b)

Ventilation : natural ventilation, intermittent extract fans

Effective air change rate

0.57	0.56	0.56	0.55	0.55	0.54	0.54	0.53	0.54	0.55	0.55	0.56	(25)

3. Heat losses and heat loss parameter

Element	Gross area, m²	Openings m²	Net area A, m²	U-value W/m²K	A x U W/K	kappa-value kJ/m²K	A x K kJ/K	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**5.470**	**1.05 (1.10)**	5.76			(27)
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East) FRONT			**12.670**	**1.05 (1.10)**	13.35			(27)
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**3.920**	**1.10**	4.31			(26)
Walls HALLWAY			24.96	0.13 (Ru=0.85)	3.32	70.00	1747.20	(29)
Walls EXTERNAL #WINDOWS & DOORS			42.56	0.15	6.38	70.00	2979.20	(29)
Flat roofs MAIN ROOF			10.72	0.13	1.39	9.00	96.48	(30)
Party wall SOLID			18.42	0.00	0.00	180.00	3315.60	
Party floor ANOTHER DWELLING BELOW			76.92	0.00	0.00	40.00	3076.80	
Party ceiling ANOTHER DWELLING ABOVE			66.20	0.00	0.00	30.00	1986.00	

Total area of external elements Sigma A, m²	100.30	(31)
Fabric heat loss, W/K	34.52	(33)
Heat capacity	13201.28	(34)
Thermal mass parameter, kJ/m²K	171.62	(35)
Effect of thermal bridges	13.30	(36)
Total fabric heat loss	47.82	(37)

Ventilation heat loss calculated monthly

39.81	39.63	39.45	38.62	38.47	37.74	37.74	37.61	38.02	38.47	38.78	39.11	(38)

Heat transfer coefficient, W/K

87.64	87.45	87.28	86.45	86.29	85.56	85.56	85.43	85.84	86.29	86.60	86.93	
											86.44	(39)

Heat loss parameter (HLP), W/m²K

1.14	1.14	1.13	1.12	1.12	1.11	1.11	1.11	1.12	1.12	1.13	1.13	

HLP (average) 1.12 (40)

Number of days in month (Table 1a)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements **kWh/year**

Assumed occupancy, N 2.40 (42)

Annual average hot water usage in litres per day Vd,average 96.05 (43)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water usage in litres per day for each month												
105.65	101.81	97.97	94.12	90.28	86.44	86.44	90.28	94.12	97.97	101.81	105.65	(44)
Energy content of hot water used												
156.68	137.03	141.40	123.28	118.29	102.07	94.59	108.54	109.84	128.00	139.73	151.73	

Energy content (annual) 1511.17 (45)

Distribution loss

23.50	20.55	21.21	18.49	17.74	15.31	14.19	16.28	16.48	19.20	20.96	22.76	(46)

store loss determined from EN 13203-2 tests, taken from boiler data record

0.00 (50)

Hot water cylinder loss factor (kWh/day) 0.0000 (51)

Volume factor 0.0000 (52)

Temperature factor 0.0000 (53)

Energy lost from store (kWh/day) 0.00 (55)

Total storage loss

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(56)
Net storage loss												
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(57)
Primary loss												
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(59)
Combi loss calculated for each month												
26.47	23.89	26.39	25.45	26.24	25.33	26.13	26.20	25.40	26.33	25.56	26.45	(61)
Total heat required for water heating calculated for each month												
183.14	160.92	167.79	148.73	144.53	127.40	120.72	134.74	135.23	154.33	165.29	178.18	(62)
Output from water heater for each month, kWh/month												
183.14	160.92	167.79	148.73	144.53	127.40	120.72	134.74	135.23	154.33	165.29	178.18	(64)

1821.00 (64)

Heat gains from water heating, kWh/month

58.71	51.53	53.61	47.35	45.89	40.27	37.98	42.64	42.87	49.14	52.85	57.06	(65)

5. Internal gains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains, Watts												
144.11	144.11	144.11	144.11	144.11	144.11	144.11	144.11	144.11	144.11	144.11	144.11	(66)
Lighting gains												
47.45	42.14	34.27	25.95	19.40	16.37	17.69	23.00	30.87	39.19	45.74	48.77	(67)
Appliances gains												
317.74	321.03	312.72	295.04	272.71	251.72	237.70	234.41	242.72	260.40	282.73	303.72	(68)
Cooking gains												
51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	51.81	(69)
Pumps and fans gains												
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	(70)
Losses e.g. evaporation (negative values)												
-96.07	-96.07	-96.07	-96.07	-96.07	-96.07	-96.07	-96.07	-96.07	-96.07	-96.07	-96.07	(71)
Water heating gains												
78.91	76.69	72.06	65.77	61.68	55.93	51.05	57.31	59.54	66.05	73.40	76.70	(72)
Total internal gains												
546.95	542.71	521.91	489.60	456.64	426.88	409.30	417.57	435.97	468.50	504.73	532.03	(73)

6. Solar gains (calculation for January)

	Area & Flux	g & FF	Shading	Gains	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 5.470	19.64	0.63 x 0.80	0.77	37.5231	
REAR						
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East)	0.9 x 12.670	19.64	0.63 x 0.80	0.77	86.9136	
FRONT						
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 3.920	19.64	0.63 x 0.80	0.77	26.8904	
REAR						
Total solar gains, January					151.33	(83-1)

Solar gains

151.33	296.03	487.52	711.01	871.37	892.00	849.23	729.47	567.00	351.26	188.69	124.44	(83)

Total gains

698.27	838.74	1009.42	1200.61	1328.01	1318.88	1258.52	1147.04	1002.97	819.76	693.41	656.47	(84)

Lighting calculations

	Area	g	FF x Shading	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 5.47	0.80	0.80 x 0.83	2.62
REAR				
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East)	0.9 x 12.67	0.80	0.80 x 0.83	6.06
FRONT				

7. Mean internal temperature

Temperature during heating periods in the living area, Th1 (°C) 21.00 (85)

Heating system responsiveness 1.00

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau											
41.84	41.93	42.02	42.42	42.50	42.86	42.86	42.92	42.72	42.50	42.34	42.18
alpha											
3.79	3.80	3.80	3.83	3.83	3.86	3.86	3.86	3.85	3.83	3.82	3.81
Utilisation factor for gains for living area											
0.97	0.94	0.87	0.74	0.57	0.41	0.30	0.34	0.56	0.83	0.94	0.97 (86)
Mean internal temperature in living area T1											
19.72	19.99	20.37	20.73	20.92	20.98	21.00	20.99	20.94	20.64	20.10	19.66 (87)
Temperature during heating periods in rest of dwelling Th2											
19.97	19.97	19.97	19.98	19.98	19.99	19.99	19.99	19.99	19.98	19.98	19.98 (88)
Utilisation factor for gains for rest of dwelling											
0.96	0.93	0.85	0.70	0.51	0.35	0.23	0.27	0.49	0.79	0.93	0.97 (89)
Mean internal temperature in the rest of dwelling T2											
18.29	18.68	19.21	19.69	19.91	19.98	19.99	19.99	19.94	19.59	18.86	18.22 (90)

Living area fraction (34.67 / 76.92) 0.45 (91)

Mean internal temperature (for the whole dwelling)

18.94	19.27	19.73	20.16	20.36	20.43	20.44	20.44	20.39	20.06	19.42	18.87 (92)

Apply adjustment to the mean internal temperature, where appropriate

18.94	19.27	19.73	20.16	20.36	20.43	20.44	20.44	20.39	20.06	19.42	18.87 (93)

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains											
0.95	0.92	0.84	0.70	0.53	0.37	0.26	0.30	0.51	0.79	0.92	0.96 (94)
Useful gains											
664.69	768.51	849.30	843.74	708.94	491.53	327.43	342.92	516.02	648.94	639.97	630.04 (95)
Monthly average external temperature											
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20 (96)
Heat loss rate for mean internal temperature											
1282.63	1256.71	1154.83	973.26	747.42	498.90	328.80	345.27	540.29	816.72	1066.89	1275.11 (97)
Fraction of month for heating											
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
Space heating requirement for each month, kWh/month											
459.75	328.07	227.32	93.25	28.63	-	-	-	-	124.83	307.38	479.93

Total space heating requirement per year (kWh/year) (October to May) 2049.15 (98)

Space heating requirement per m² (kWh/m²/year) 26.64 (99)

8c. Space cooling requirement - not applicable

9a. Energy requirements

kWh/year

No secondary heating system selected

Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main heating system	93.20%	(206)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement												
459.75	328.07	227.32	93.25	28.63	-	-	-	-	124.83	307.38	479.93	(98)
Appendix Q - monthly energy saved (main heating system 1)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space heating fuel (main heating system 1)												
493.29	352.00	243.90	100.05	30.72	-	-	-	-	133.94	329.81	514.95	(211)
Appendix Q - monthly energy saved (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space heating fuel (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendix Q - monthly energy saved (secondary heating system)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space heating fuel (secondary)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water heating												
Water heating requirement												
183.14	160.92	167.79	148.73	144.53	127.40	120.72	134.74	135.23	154.33	165.29	178.18	(64)
Efficiency of water heater												87.30 (216)
89.35	89.22	88.95	88.40	87.77	87.30	87.30	87.30	87.30	88.57	89.16	89.40	(217)
Water heating fuel												
204.96	180.35	188.64	168.26	164.68	145.94	138.28	154.34	154.90	174.24	185.37	199.31	(219)

Annual totals	kWh/year	
Space heating fuel used, main system 1	2198.66	(211)
Space heating fuel (secondary)	0.00	(215)
Water heating fuel	2059.27	(219)
Electricity for pumps, fans and electric keep-hot		
central heating pump	30.00	(230c)
boiler with a fan-assisted flue	45.00	(230e)
Total electricity for the above, kWh/year	75.00	(231)
Electricity for lighting (100.00% fixed LEL)	335.17	(232)
Energy saving/generation technologies		
PVs 0.80 x 1.000 x 1079.525 x 1.000	863.620	
PVs 0.80 x 0.000 x 0.000 x 0.500	0.000	
PVs 0.80 x 0.000 x 0.000 x 0.500	0.000	
	863.620	(233)
Appendix Q -		
Energy saved or generated ():	0.000	(236a)
Energy used ():	0.000	(237a)
Total delivered energy for all uses	3804.48	(238)

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

10a. Fuel costs using Table 12 prices

	kWh/year	Fuel price p/kWh	£/year	
Space heating - main system 1	2198.657	3.480	76.51	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
Water heating cost	2059.27	3.480	71.66	(247)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	75.000	13.190	9.89	(249)
Energy for lighting	335.170	13.190	44.21	(250)
Additional standing charges			120.00	(251)
Electricity generated - PVs	863.620	13.190	-113.91	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			208.37	(255)

11a. SAP rating

	0.42	**(256)**
	0.72	**(257)**
SAP value	89.99	
	90	(258)
SAP band	**B**	

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating, main system 1	2198.66	0.216	474.91	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	2059.27	0.216	444.80	(264)
Space and water heating			919.71	(265)
Electricity for pumps and fans	75.00	0.519	38.93	(267)
Electricity for lighting	335.17	0.519	173.95	(268)
Electricity generated - PVs	-863.62	0.519	-448.22	(269)
Electricity generated - µCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			684.37	(272)

	kg/m²/year	
CO2 emissions per m²	**8.90**	(273)
EI value	92.48	(273a)
EI rating	**92**	(274)
EI band	**A**	

Calculation of stars for heating and DHW

Main heating energy efficiency	(3.48 / 0.9020) x (1 + (0.29 x 0.00)) = 3.8581, stars = 4
Main heating environmental impact	(0.2160 / 0.9020) x (1 + (0.29 x 0.00)) = 0.2395, stars = 4
Water heating energy efficiency	3.48 / 0.8833 = 3.9395, stars = 4
Water heating environmental impact	0.2160 / 0.8833 = 0.2445, stars = 4

Project Information
Building type Top-floor flat

Reference
Date 8 January 2019
Email: none Project Flat 3
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England
assessed by program JPA Designer version 6.05.054, printed on 21/10/2021 at 22:21:13

New dwelling as designed

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1 TER and DER
Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate	TER = n/a	
Dwelling Carbon Dioxide Emission Rate	DER = 10.33	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	TFEE = 47.2	
Dwelling Fabric Energy Efficiency (DFEE)	DFEE = n/a	OK

2a Thermal bridging
Thermal bridging calculated from linear thermal transmittances for each junction

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2b Fabric U-values

Element	Average	Highest	
Wall	0.14 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.00 (max. 0.25)	0.00 (max. 0.70)	OK
Roof	0.13 (max. 0.20)	0.13 (max. 0.35)	OK
Openings	1.10 (max. 2.00)	1.10 (max. 3.30)	OK

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3 Air permeability

Air permeability at 50 pascals:	3.90	OK
Maximum :	10.00	

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4 Heating efficiency
Main heating system:
Boiler and underfloor heating, mains gas
Vaillant ecoFIT sustain 835
Source of efficiency: from boiler database
Vaillant ecoFIT sustain 835 VUW 356/6-3 (H-GB)
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0% OK
Secondary heating system:
None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley): OK

Slight OK

Based on:

Thermal mass parameter : 171.62

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.10 W/m²K

Walls U-value 0.13 W/m²K

Design air permeability 3.9 m³/h.m²

Photovoltaic array

Project Information

Building type Top-floor flat

Reference
Date 8 January 2019
Email: none Project Flat 4
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m^2)	Av. Storey height (m)	Volume (m^3)	
Fourth and other floors	69.17	2.52	174.31	(3a)
	69.17			**(4)**
			174.31	**(5)**

2. Ventilation rate

			m³ per hour	
	main + seondary + other heating			
Number of chimneys	0 + 0 + 0	x 40	0.00	(6a)
Number of open flues	0 + 0 + 0	x 20	0.00	(6b)
Number of intermittent fans	3	x 10	30.00	(7a)
Number of passive vents	0	x 10	0.00	(7b)
Number of flueless gas fires	0	x 40	0.00	(7c)

		Air changes per hour	
		0.17	**(8)**
Pressure test, result q50	3.90		(17)
Air permeability		0.37	(18)
		2.00	**(19)**
		0.85	**(20)**
Infiltration rate incorporating shelter factor		0.31	(21)

Infiltration rate modified for monthly wind speed

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70

52.50 (22)

Wind Factor

1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18

13.13 (22a)

Adjusted infiltration rate (allowing for shelter and wind speed)

0.40	0.39	0.38	0.34	0.34	0.30	0.30	0.29	0.31	0.34	0.35	0.37

4.10 (22b)

Ventilation : natural ventilation, intermittent extract fans

Effective air change rate

0.58	0.58	0.57	0.56	0.56	0.54	0.54	0.54	0.55	0.56	0.56	0.57	(25)

3. Heat losses and heat loss parameter

Element	Gross area, m²	Openings m²	Net area A, m²	U-value W/m²K	A x U W/K	kappa-value kJ/m²K	A x K kJ/K	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**3.480**	**1.05 (1.10)**	3.67			(27)
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East) FRONT			**10.840**	**1.05 (1.10)**	11.42			(27)
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**7.752**	**1.10**	8.53			(26)
Walls HALLWAY			15.40	0.13 (Ru=0.85)	2.05	70.00	1078.00	(29)
Walls EXTERNAL #WINDOWS & DOORS			63.51	0.15	9.53	70.00	4445.55	(29)
Flat roofs MAIN ROOF			69.17	0.13	8.99	9.00	622.53	(30)
Party floor ANOTHER DWELLING BELOW			69.17	0.00	0.00	40.00	2766.80	

Total area of external elements Sigma A, m²	170.15	(31)
Fabric heat loss, W/K	44.18	(33)
Heat capacity	8912.88	(34)
Thermal mass parameter, kJ/m²K	128.85	(35)
Effect of thermal bridges	13.30	(36)
Total fabric heat loss	57.48	(37)

Ventilation heat loss calculated monthly

33.31	33.14	32.96	32.15	32.00	31.29	31.29	31.16	31.56	32.00	32.31	32.63	(38)

Heat transfer coefficient, W/K

90.80	90.62	90.45	89.63	89.48	88.77	88.77	88.64	89.04	89.48	89.79	90.11	

89.63 (39)

Heat loss parameter (HLP), W/m²K

1.31	1.31	1.31	1.30	1.29	1.28	1.28	1.28	1.29	1.29	1.30	1.30	

HLP (average) 1.30 (40)

Number of days in month (Table 1a)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements **kWh/year**

Assumed occupancy, N 2.23 (42)

Annual average hot water usage in litres per day Vd,average 91.65 (43)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hot water usage in litres per day for each month											
100.81	97.14	93.48	89.81	86.15	82.48	82.48	86.15	89.81	93.48	97.14	100.81 (44)
Energy content of hot water used											
149.50	130.75	134.92	117.63	112.87	97.40	90.25	103.57	104.80	122.14	133.32	144.78

Energy content (annual) 1441.94 (45)

Distribution loss

22.42	19.61	20.24	17.64	16.93	14.61	13.54	15.53	15.72	18.32	20.00	21.72 (46)

store loss determined from EN 13203-2 tests, taken from boiler data record

0.00 (50)

Hot water cylinder loss factor (kWh/day) 0.0000 (51)

Volume factor 0.0000 (52)

Temperature factor 0.0000 (53)

Energy lost from store (kWh/day) 0.00 (55)

Total storage loss

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00 (56)
Net storage loss											
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00 (57)
Primary loss											
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00 (59)
Combi loss calculated for each month											
26.43	23.84	26.33	25.41	26.20	25.29	26.10	26.16	25.35	26.28	25.51	26.41 (61)
Total heat required for water heating calculated for each month											
175.93	154.59	161.25	143.04	139.07	122.69	116.35	129.73	130.16	148.41	158.84	171.19 (62)
Output from water heater for each month, kWh/month											
175.93	154.59	161.25	143.04	139.07	122.69	116.35	129.73	130.16	148.41	158.84	171.19 (64)

1751.26 (64)

Heat gains from water heating, kWh/month											
56.32	49.44	51.44	45.46	44.08	38.71	36.53	40.98	41.19	47.18	50.71	54.74 (65)

5. Internal gains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains, Watts												
133.55	133.55	133.55	133.55	133.55	133.55	133.55	133.55	133.55	133.55	133.55	133.55	(66)
Lighting gains												
43.54	38.67	31.45	23.81	17.80	15.03	16.24	21.10	28.33	35.97	41.98	44.75	(67)
Appliances gains												
291.57	294.60	286.97	270.74	250.25	230.99	218.13	215.10	222.73	238.96	259.45	278.71	(68)
Cooking gains												
50.58	50.58	50.58	50.58	50.58	50.58	50.58	50.58	50.58	50.58	50.58	50.58	(69)
Pumps and fans gains												
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	(70)
Losses e.g. evaporation (negative values)												
-89.03	-89.03	-89.03	-89.03	-89.03	-89.03	-89.03	-89.03	-89.03	-89.03	-89.03	-89.03	(71)
Water heating gains												
75.69	73.56	69.15	63.14	59.25	53.76	49.10	55.08	57.20	63.41	70.43	73.58	(72)
Total internal gains												
508.90	504.93	485.66	455.79	425.39	397.88	381.57	389.38	406.35	436.44	469.95	495.13	(73)

6. Solar gains (calculation for January)

	Area & Flux	g & FF	Shading	Gains	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 3.480	19.64	0.63 x 0.80	0.77	23.8721	
REAR						
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East)	0.9 x 10.840	19.64	0.63 x 0.80	0.77	74.3615	
FRONT						
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 7.752	19.64	0.63 x 0.80	0.77	53.1771	
REAR						
Total solar gains, January					151.41	(83-1)

Solar gains

151.41	296.19	487.79	711.41	871.85	892.50	849.69	729.88	567.31	351.46	188.79	124.51	(83)
Total gains												
660.31	801.12	973.45	1167.20	1297.25	1290.38	1231.26	1119.26	973.67	787.89	658.74	619.64	(84)

Lighting calculations

	Area	g	FF x Shading	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West)	0.9 x 3.48	0.80	0.80 x 0.83	1.66
REAR				
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East)	0.9 x 10.84	0.80	0.80 x 0.83	5.18
FRONT				

7. Mean internal temperature

Temperature during heating periods in the living area, Th1 (°C) 21.00 (85)

Heating system responsiveness 1.00

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau											
27.27	27.32	27.37	27.62	27.67	27.89	27.89	27.93	27.80	27.67	27.57	27.48
alpha											
2.82	2.82	2.82	2.84	2.84	2.86	2.86	2.86	2.85	2.84	2.84	2.83
Utilisation factor for gains for living area											
0.94	0.91	0.84	0.71	0.56	0.42	0.31	0.35	0.56	0.80	0.92	0.95 (86)
Mean internal temperature in living area T1											
19.12	19.46	19.95	20.46	20.78	20.93	20.98	20.97	20.84	20.36	19.64	19.05 (87)
Temperature during heating periods in rest of dwelling Th2											
19.83	19.83	19.83	19.84	19.85	19.85	19.85	19.86	19.85	19.85	19.84	19.84 (88)
Utilisation factor for gains for rest of dwelling											
0.93	0.89	0.81	0.67	0.51	0.35	0.23	0.27	0.48	0.76	0.90	0.94 (89)
Mean internal temperature in the rest of dwelling T2											
17.39	17.87	18.55	19.24	19.63	19.80	19.84	19.84	19.72	19.13	18.14	17.29 (90)

Living area fraction (29.00 / 69.17) 0.42 (91)

Mean internal temperature (for the whole dwelling)

18.12	18.54	19.14	19.75	20.11	20.28	20.32	20.31	20.19	19.65	18.77	18.03 (92)

Apply adjustment to the mean internal temperature, where appropriate

18.12	18.54	19.14	19.75	20.11	20.28	20.32	20.31	20.19	19.65	18.77	18.03 (93)

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains											
0.92	0.87	0.79	0.67	0.52	0.37	0.26	0.30	0.51	0.75	0.88	0.93 (94)
Useful gains											
604.21	698.61	773.62	780.95	676.18	482.45	324.51	338.33	491.85	590.84	579.94	573.40 (95)
Monthly average external temperature											
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20 (96)
Heat loss rate for mean internal temperature											
1254.52	1235.74	1143.36	972.73	752.85	503.89	330.15	346.79	542.40	809.69	1047.66	1246.37 (97)
Fraction of month for heating											
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
Space heating requirement for each month, kWh/month											
483.83	360.95	275.08	138.09	57.04	-	-	-	-	162.82	336.76	500.69

Total space heating requirement per year (kWh/year) (October to May) 2315.26 (98)

Space heating requirement per m² (kWh/m²/year) 33.47 (99)

8c. Space cooling requirement - not applicable

9a. Energy requirements

kWh/year

No secondary heating system selected

Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main heating system	93.20%	(206)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement												
483.83	360.95	275.08	138.09	57.04	-	-	-	-	162.82	336.76	500.69	(98)
Appendix Q - monthly energy saved (main heating system 1)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space heating fuel (main heating system 1)												
519.13	387.29	295.15	148.16	61.20	-	-	-	-	174.70	361.33	537.22	(211)
Appendix Q - monthly energy saved (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space heating fuel (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendix Q - monthly energy saved (secondary heating system)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space heating fuel (secondary)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water heating												
Water heating requirement												
175.93	154.59	161.25	143.04	139.07	122.69	116.35	129.73	130.16	148.41	158.84	171.19	(64)
Efficiency of water heater												87.30 (216)
89.41	89.31	89.11	88.70	88.12	87.30	87.30	87.30	87.30	88.79	89.25	89.44	(217)
Water heating fuel												
196.78	173.10	180.97	161.26	157.81	140.54	133.28	148.60	149.09	167.15	177.97	191.40	(219)

Annual totals	kWh/year	
Space heating fuel used, main system 1	2484.19	(211)
Space heating fuel (secondary)	0.00	(215)
Water heating fuel	1977.93	(219)
Electricity for pumps, fans and electric keep-hot		
central heating pump	30.00	(230c)
boiler with a fan-assisted flue	45.00	(230e)
Total electricity for the above, kWh/year	75.00	(231)
Electricity for lighting (100.00% fixed LEL)	307.57	(232)
Energy saving/generation technologies		
Appendix Q -		
Energy saved or generated ():	0.000	(236a)
Energy used ():	0.000	(237a)
Total delivered energy for all uses	4844.69	(238)

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

10a. Fuel costs using Table 12 prices

	kWh/year	Fuel price p/kWh	£/year	
Space heating - main system 1	2484.186	3.480	86.45	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
Water heating cost	1977.93	3.480	68.83	(247)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	75.000	13.190	9.89	(249)
Energy for lighting	307.568	13.190	40.57	(250)
Additional standing charges			120.00	(251)
Electricity generated - PVs	0.000	0.000	0.00	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			325.74	(255)

11a. SAP rating

	0.42	**(256)**
	1.20	**(257)**
SAP value	83.28	
	83	(258)
SAP band	**B**	

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating, main system 1	2484.19	0.216	536.58	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	1977.93	0.216	427.23	(264)
Space and water heating			963.82	(265)
Electricity for pumps and fans	75.00	0.519	38.93	(267)
Electricity for lighting	307.57	0.519	159.63	(268)
Electricity generated - PVs	0.00	0.519	0.00	(269)
Electricity generated - µCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			1162.37	(272)

	kg/m²/year	
CO2 emissions per m²	**16.80**	(273)
EI value	86.36	(273a)
EI rating	**86**	(274)
EI band	**B**	

Calculation of stars for heating and DHW

Main heating energy efficiency	(3.48 / 0.9020) x (1 + (0.29 x 0.00)) = 3.8581, stars = 4
Main heating environmental impact	(0.2160 / 0.9020) x (1 + (0.29 x 0.00)) = 0.2395, stars = 4
Water heating energy efficiency	3.48 / 0.8844 = 3.9347, stars = 4
Water heating environmental impact	0.2160 / 0.8844 = 0.2442, stars = 4

Project Information
Building type Top-floor flat

Reference
Date 8 January 2019
Email: none Project Flat 4
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England
assessed by program JPA Designer version 6.05.054, printed on 21/10/2021 at 22:21:12

New dwelling as designed

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1 TER and DER
Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate	TER = 19.92	
Dwelling Carbon Dioxide Emission Rate	DER = 18.07	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	TFEE = 57.2	
Dwelling Fabric Energy Efficiency (DFEE)	DFEE = 47.1	OK

2a Thermal bridging
Thermal bridging calculated from linear thermal transmittances for each junction

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2b Fabric U-values

Element	Average	Highest	
Wall	0.15 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.00 (max. 0.25)	0.00 (max. 0.70)	OK
Roof	0.13 (max. 0.20)	0.13 (max. 0.35)	OK
Openings	1.10 (max. 2.00)	1.10 (max. 3.30)	OK

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3 Air permeability

Air permeability at 50 pascals:	3.90	OK
Maximum :	10.00	

---

4 Heating efficiency
Main heating system:
Boiler and underfloor heating, mains gas
Vaillant ecoFIT sustain 835
Source of efficiency: from boiler database
Vaillant ecoFIT sustain 835 VUW 356/6-3 (H-GB)
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0% OK
Secondary heating system:
None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley): OK

Medium OK

Based on:

Thermal mass parameter : 128.85

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.10 W/m²K

Walls U-value 0.13 W/m²K

Design air permeability 3.9 m³/h.m²

Project Information

Building type Top-floor flat

Reference
Date 8 January 2019
Email: none Project Flat 4
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

SAP 2012 worksheet for New dwelling as designed - calculation of energy ratings

1. Overall dwelling dimensions

	Area (m^2)	Av. Storey height (m)	Volume (m^3)	
Fourth and other floors	69.17	2.52	174.31	(3a)
	69.17			**(4)**
			174.31	**(5)**

2. Ventilation rate

			m³ per hour	
	main + seondary + other heating			
Number of chimneys	0 + 0 + 0	x 40	0.00	(6a)
Number of open flues	0 + 0 + 0	x 20	0.00	(6b)
Number of intermittent fans	3	x 10	30.00	(7a)
Number of passive vents	0	x 10	0.00	(7b)
Number of flueless gas fires	0	x 40	0.00	(7c)

		Air changes per hour	
		0.17	**(8)**
Pressure test, result q50	3.90		(17)
Air permeability		0.37	(18)
		2.00	**(19)**
		0.85	**(20)**
Infiltration rate incorporating shelter factor		0.31	(21)

Infiltration rate modified for monthly wind speed

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5.10	5.00	4.90	4.40	4.30	3.80	3.80	3.70	4.00	4.30	4.50	4.70

52.50 (22)

Wind Factor

1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18

13.13 (22a)

Adjusted infiltration rate (allowing for shelter and wind speed)

0.40	0.39	0.38	0.34	0.34	0.30	0.30	0.29	0.31	0.34	0.35	0.37

4.10 (22b)

Ventilation : natural ventilation, intermittent extract fans

Effective air change rate

0.58	0.58	0.57	0.56	0.56	0.54	0.54	0.54	0.55	0.56	0.56	0.57	(25)

3. Heat losses and heat loss parameter

Element	Gross area, m²	Openings m²	Net area A, m²	U-value W/m²K	A x U W/K	kappa-value kJ/m²K	A x K kJ/K	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East) FRONT			**10.840**	**1.05 (1.10)**	11.42			(27)
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**3.480**	**1.05 (1.10)**	3.67			(27)
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR			**7.752**	**1.10**	8.53			(26)
Walls HALLWAY			15.40	0.13 (Ru=0.85)	2.05	70.00	1078.00	(29)
Walls EXTERNAL #WINDOWS & DOORS			63.51	0.15	9.53	70.00	4445.55	(29)
Flat roofs MAIN ROOF			69.17	0.13	8.99	9.00	622.53	(30)
Party floor ANOTHER DWELLING BELOW			69.17	0.00	0.00	40.00	2766.80	

Total area of external elements Sigma A, m²	170.15	(31)
Fabric heat loss, W/K	44.18	(33)
Heat capacity	8912.88	(34)
Thermal mass parameter, kJ/m²K	128.85	(35)
Effect of thermal bridges	13.30	(36)
Total fabric heat loss	57.48	(37)

Ventilation heat loss calculated monthly

33.31	33.14	32.96	32.15	32.00	31.29	31.29	31.16	31.56	32.00	32.31	32.63	(38)

Heat transfer coefficient, W/K

90.80	90.62	90.45	89.63	89.48	88.77	88.77	88.64	89.04	89.48	89.79	90.11	

89.63 (39)

Heat loss parameter (HLP), W/m²K

1.31	1.31	1.31	1.30	1.29	1.28	1.28	1.28	1.29	1.29	1.30	1.30	

HLP (average) 1.30 (40)

Number of days in month (Table 1a)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
31	28	31	30	31	30	31	31	30	31	30	31

4. Water heating energy requirements **kWh/year**

Assumed occupancy, N 2.23 (42)

Annual average hot water usage in litres per day Vd,average 91.65 (43)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Hot water usage in litres per day for each month											
100.81	97.14	93.48	89.81	86.15	82.48	82.48	86.15	89.81	93.48	97.14	100.81 (44)
Energy content of hot water used											
149.50	130.75	134.92	117.63	112.87	97.40	90.25	103.57	104.80	122.14	133.32	144.78

Energy content (annual) 1441.94 (45)

Distribution loss

22.42	19.61	20.24	17.64	16.93	14.61	13.54	15.53	15.72	18.32	20.00	21.72 (46)

store loss determined from EN 13203-2 tests, taken from boiler data record

0.00 (50)

Hot water cylinder loss factor (kWh/day) 0.0000 (51)

Volume factor 0.0000 (52)

Temperature factor 0.0000 (53)

Energy lost from store (kWh/day) 0.00 (55)

Total storage loss

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00 (56)
Net storage loss											
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00 (57)
Primary loss											
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00 (59)
Combi loss calculated for each month											
26.43	23.84	26.33	25.41	26.20	25.29	26.10	26.16	25.35	26.28	25.51	26.41 (61)
Total heat required for water heating calculated for each month											
175.93	154.59	161.25	143.04	139.07	122.69	116.35	129.73	130.16	148.41	158.84	171.19 (62)
Output from water heater for each month, kWh/month											
175.93	154.59	161.25	143.04	139.07	122.69	116.35	129.73	130.16	148.41	158.84	171.19 (64)

1751.26 (64)

Heat gains from water heating, kWh/month											
56.32	49.44	51.44	45.46	44.08	38.71	36.53	40.98	41.19	47.18	50.71	54.74 (65)

5. Internal gains

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabolic gains, Watts												
133.55	133.55	133.55	133.55	133.55	133.55	133.55	133.55	133.55	133.55	133.55	133.55	(66)
Lighting gains												
43.54	38.67	31.45	23.81	17.80	15.03	16.24	21.10	28.33	35.97	41.98	44.75	(67)
Appliances gains												
291.57	294.60	286.97	270.74	250.25	230.99	218.13	215.10	222.73	238.96	259.45	278.71	(68)
Cooking gains												
50.58	50.58	50.58	50.58	50.58	50.58	50.58	50.58	50.58	50.58	50.58	50.58	(69)
Pumps and fans gains												
3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	(70)
Losses e.g. evaporation (negative values)												
-89.03	-89.03	-89.03	-89.03	-89.03	-89.03	-89.03	-89.03	-89.03	-89.03	-89.03	-89.03	(71)
Water heating gains												
75.69	73.56	69.15	63.14	59.25	53.76	49.10	55.08	57.20	63.41	70.43	73.58	(72)
Total internal gains												
508.90	504.93	485.66	455.79	425.39	397.88	381.57	389.38	406.35	436.44	469.95	495.13	(73)

6. Solar gains (calculation for January)

	Area & Flux	g & FF	Shading	Gains	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East) FRONT	0.9 x 10.840	19.64 0.63 x 0.80	0.77	74.3615	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR	0.9 x 3.480	19.64 0.63 x 0.80	0.77	23.8721	
Full glazed door - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR	0.9 x 7.752	19.64 0.63 x 0.80	0.77	53.1771	
Total solar gains, January				151.41	(83-1)

Solar gains												
151.41	296.19	487.79	711.41	871.85	892.50	849.69	729.88	567.31	351.46	188.79	124.51	(83)
Total gains												
660.31	801.12	973.45	1167.20	1297.25	1290.38	1231.26	1119.26	973.67	787.89	658.74	619.64	(84)

Lighting calculations

	Area	g	FF x Shading	
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (East) FRONT	0.9 x 10.84	0.80	0.80 x 0.83	5.18
Window - Double-glazed, argon filled, low-E, En=0.1, soft coat (West) REAR	0.9 x 3.48	0.80	0.80 x 0.83	1.66

7. Mean internal temperature

Temperature during heating periods in the living area, Th1 (°C) 21.00 (85)

Heating system responsiveness 1.00

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau											
27.27	27.32	27.37	27.62	27.67	27.89	27.89	27.93	27.80	27.67	27.57	27.48
alpha											
2.82	2.82	2.82	2.84	2.84	2.86	2.86	2.86	2.85	2.84	2.84	2.83
Utilisation factor for gains for living area											
0.94	0.91	0.84	0.71	0.56	0.42	0.31	0.35	0.56	0.80	0.92	0.95 (86)
Mean internal temperature in living area T1											
19.12	19.46	19.95	20.46	20.78	20.93	20.98	20.97	20.84	20.36	19.64	19.05 (87)
Temperature during heating periods in rest of dwelling Th2											
19.83	19.83	19.83	19.84	19.85	19.85	19.85	19.86	19.85	19.85	19.84	19.84 (88)
Utilisation factor for gains for rest of dwelling											
0.93	0.89	0.81	0.67	0.51	0.35	0.23	0.27	0.48	0.76	0.90	0.94 (89)
Mean internal temperature in the rest of dwelling T2											
17.39	17.87	18.55	19.24	19.63	19.80	19.84	19.84	19.72	19.13	18.14	17.29 (90)

Living area fraction (29.00 / 69.17) 0.42 (91)

Mean internal temperature (for the whole dwelling)

18.12	18.54	19.14	19.75	20.11	20.28	20.32	20.31	20.19	19.65	18.77	18.03 (92)

Apply adjustment to the mean internal temperature, where appropriate

18.12	18.54	19.14	19.75	20.11	20.28	20.32	20.31	20.19	19.65	18.77	18.03 (93)

8. Space heating requirement

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation factor for gains											
0.92	0.87	0.79	0.67	0.52	0.37	0.26	0.30	0.51	0.75	0.88	0.93 (94)
Useful gains											
604.21	698.61	773.62	780.95	676.18	482.45	324.51	338.33	491.85	590.84	579.94	573.40 (95)
Monthly average external temperature											
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20 (96)
Heat loss rate for mean internal temperature											
1254.52	1235.74	1143.36	972.73	752.85	503.89	330.15	346.79	542.40	809.69	1047.66	1246.37 (97)
Fraction of month for heating											
1.00	1.00	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00
Space heating requirement for each month, kWh/month											
483.83	360.95	275.08	138.09	57.04	-	-	-	-	162.82	336.76	500.69

Total space heating requirement per year (kWh/year) (October to May) 2315.26 (98)

Space heating requirement per m² (kWh/m²/year) 33.47 (99)

8c. Space cooling requirement - not applicable

9a. Energy requirements

kWh/year

No secondary heating system selected

Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main heating system	93.20%	(206)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement												
483.83	360.95	275.08	138.09	57.04	-	-	-	-	162.82	336.76	500.69	(98)
Appendix Q - monthly energy saved (main heating system 1)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space heating fuel (main heating system 1)												
519.13	387.29	295.15	148.16	61.20	-	-	-	-	174.70	361.33	537.22	(211)
Appendix Q - monthly energy saved (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space heating fuel (main heating system 2)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendix Q - monthly energy saved (secondary heating system)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space heating fuel (secondary)												
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water heating												
Water heating requirement												
175.93	154.59	161.25	143.04	139.07	122.69	116.35	129.73	130.16	148.41	158.84	171.19	(64)
Efficiency of water heater												87.30 (216)
89.41	89.31	89.11	88.70	88.12	87.30	87.30	87.30	87.30	88.79	89.25	89.44	(217)
Water heating fuel												
196.78	173.10	180.97	161.26	157.81	140.54	133.28	148.60	149.09	167.15	177.97	191.40	(219)

Annual totals	kWh/year	
Space heating fuel used, main system 1	2484.19	(211)
Space heating fuel (secondary)	0.00	(215)
Water heating fuel	1977.93	(219)
Electricity for pumps, fans and electric keep-hot		
central heating pump	30.00	(230c)
boiler with a fan-assisted flue	45.00	(230e)
Total electricity for the above, kWh/year	75.00	(231)
Electricity for lighting (100.00% fixed LEL)	307.57	(232)
Energy saving/generation technologies		
PVs 0.80 x 0.900 x 1079.525 x 1.000	777.258	
PVs 0.80 x 0.000 x 0.000 x 0.500	0.000	
PVs 0.80 x 0.000 x 0.000 x 0.500	0.000	
	777.258	(233)
Appendix Q -		
Energy saved or generated ():	0.000	(236a)
Energy used ():	0.000	(237a)
Total delivered energy for all uses	4067.43	(238)

10a. Fuel costs using Table 12 prices

	kWh/year	Fuel price p/kWh	£/year	
Space heating - main system 1	2484.186	3.480	86.45	(240)
Space heating - main system 2	0.000	0.000	0.00	(241)
Water heating cost	1977.93	3.480	68.83	(247)
Mech vent fans cost	0.000	13.190	0.00	(249)
Pump/fan energy cost	75.000	13.190	9.89	(249)
Energy for lighting	307.568	13.190	40.57	(250)
Additional standing charges			120.00	(251)
Electricity generated - PVs	777.258	13.190	-102.52	(252)
Appendix Q -				
Energy saved or generated ():	0.000	0.000	0.00	(253)
Energy used ():	0.000	0.000	0.00	(254)
Total energy cost			223.22	(255)

11a. SAP rating

	0.42	**(256)**
	0.82	**(257)**
SAP value	88.54	
	89	(258)
SAP band	**B**	

12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating, main system 1	2484.19	0.216	536.58	(261)
Space heating, main system 2	0.00	0.000	0.00	(262)
Space heating, secondary	0.00	0.519	0.00	(263)
Water heating	1977.93	0.216	427.23	(264)
Space and water heating			963.82	(265)
Electricity for pumps and fans	75.00	0.519	38.93	(267)
Electricity for lighting	307.57	0.519	159.63	(268)
Electricity generated - PVs	-777.26	0.519	-403.40	(269)
Electricity generated - µCHP	0.00	0.000	0.00	(269)
Appendix Q -				
Energy saved ():	0.00	0.000	0.00	(270)
Energy used ():	0.00	0.000	0.00	(271)
Total CO2, kg/year			758.97	(272)

	kg/m²/year	
CO2 emissions per m²	**10.97**	(273)
EI value	91.09	(273a)
EI rating	**91**	(274)
EI band	**B**	

Calculation of stars for heating and DHW

Main heating energy efficiency	(3.48 / 0.9020) x (1 + (0.29 x 0.00)) = 3.8581, stars = 4
Main heating environmental impact	(0.2160 / 0.9020) x (1 + (0.29 x 0.00)) = 0.2395, stars = 4
Water heating energy efficiency	3.48 / 0.8844 = 3.9347, stars = 4
Water heating environmental impact	0.2160 / 0.8844 = 0.2442, stars = 4

Project Information
Building type Top-floor flat

Reference
Date 8 January 2019
Email: none Project Flat 4
7 Fortess Road
Kentish Town
LONDON
NW5 1AA

REGULATION COMPLIANCE REPORT - Approved Document L1A, 2012 Edition, England
assessed by program JPA Designer version 6.05.054, printed on 21/10/2021 at 22:21:12

New dwelling as designed

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1 TER and DER
Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate	TER = n/a	
Dwelling Carbon Dioxide Emission Rate	DER = 12.24	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	TFEE = 57.2	
Dwelling Fabric Energy Efficiency (DFEE)	DFEE = n/a	OK

2a Thermal bridging
Thermal bridging calculated from linear thermal transmittances for each junction

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2b Fabric U-values

Element	Average	Highest	
Wall	0.15 (max. 0.30)	0.15 (max. 0.70)	OK
Floor	0.00 (max. 0.25)	0.00 (max. 0.70)	OK
Roof	0.13 (max. 0.20)	0.13 (max. 0.35)	OK
Openings	1.10 (max. 2.00)	1.10 (max. 3.30)	OK

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3 Air permeability

Air permeability at 50 pascals:	3.90	OK
Maximum :	10.00	

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4 Heating efficiency
Main heating system:
Boiler and underfloor heating, mains gas
Vaillant ecoFIT sustain 835
Source of efficiency: from boiler database
Vaillant ecoFIT sustain 835 VUW 356/6-3 (H-GB)
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0% OK
Secondary heating system:
None -

5 Cylinder insulation

Hot water storage No cylinder

6 Controls

(Also refer to "Domestic Building Services Compliance Guide" by the DCLG)

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings: 100.0%

Minimum: 75.0% OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley): OK

Medium OK

Based on:

Thermal mass parameter : 128.85

Overshading : Average or unknown (20-60 % sky blocked)

Orientation : East

Ventilation rate : 6.00

Blinds/curtains :

None with blinds/shutters closed 0.00% of daylight hours

10 Key features

Double-glazed, argon filled, low-E, En=0.1, soft coat U-value 1.10 W/m²K

Walls U-value 0.13 W/m²K

Design air permeability 3.9 m³/h.m²

Photovoltaic array