

# **ENERGY ASSESSMENT**

# **FORTESS ROAD**

PROPERTY ADDRESS

3,5 & 7 FORTESS ROAD,

LONDON,

NW51AA,

**DATE**October 21

PREPARED BY EAL Consult





# **Contents**

1.	EXECUTIVE SUMMARY	3
	INTRODUCTION	
	PLANNING POLICY CONTEXT	
4.		
5.	SUSTAINABLE DESIGN	
6.	CIRCULAR ECONOMY	14
7.	CONCLUSION	15
8	APPENDIX	16

## 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 di (Tonnes CO2 per annur	
	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 <sub>2</sub> )	% 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<sub>2</sub> 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<sub>2</sub> 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<sub>2</sub> emissions and energy requirements. It compares CO<sub>2</sub> 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 onsite
- 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.

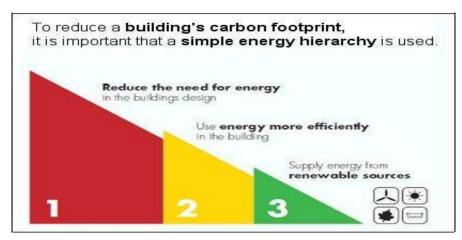


Figure 1. Energy Hierarchy

#### 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 <sup>2</sup> k					
Roof 0.20 W/m <sup>2</sup> k						
Floor	0.25 W/m <sup>2</sup> k					
Glazing	1.2 W/m <sup>2</sup> k					
Doors	1.2 W/m <sup>2</sup> k					

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 Combiboiler 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 highenergy content, would fuel this development.	<ul> <li>Less volume of storage</li> <li>Less maintenance and produce considerably less ash residue</li> </ul>	<ul> <li>Nox Emissions which may impacts</li> <li>High Costs</li> <li>Not suitable for the project</li> </ul>		
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	<ul> <li>High Costs</li> <li>Not suitable for this project</li> </ul>		
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.	<ul> <li>Can generates less CO₂ than conventional heating systems.</li> <li>Cheaper</li> <li>Provides heating and hot water</li> <li>Less maintenance</li> <li>Can be used as air-conditioning in the summer</li> </ul>	<ul><li>Needs electricity</li><li>Can be noisy</li></ul>		
Wind Turbines	<ul><li>Cheaper</li><li>Less CO<sub>2</sub></li></ul>	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.  Photovoltaic Panels (PV)		below the level generally required for investment in large wind turbines.  Noise and signal interference.  Detrimental aesthetic impact
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.	<ul> <li>Cheaper</li> <li>Less CO<sub>2</sub></li> <li>No input power in order to generate electricity.</li> </ul>	

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	22.4m²	

## 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	Total Litres							
WC	Dual flush WC 4/2.6 litre	14.72						
Basin	asin 1.7 litres/min							
Shower	24.00							
Bath	160 litres	25.60						
Sink	4 litres/min	14.13						
W/machine	Default used	16.66						
Dish Washer	Dish Washer Default used							
		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 reused 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<sub>2</sub> 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	Av. Storey	Volume	
	(m²)	height (m)	(m³)	
First floor	76.96	2.51	193.17	(3a)
	76.96			(4)
			193.17	(5)

#### 2. Ventilation rate

											m³ per ho	our
							main + s	eondar	y + othe	er		
Numbe	er of chim	nave					heating $0 + 0 + 0$	, ,	k 40		0.00	(6a)
	er of oper	•					0 + 0 + 0		k 40 k 20		0.00	(6b)
	er of inter		ne				3		k 10		30.00	(7a)
	er of pass		_				0		k 10		0.00	(7a) (7b)
	er of fluel						0		k 40		0.00	(7b) (7c)
Numbe	ei oi iiueii	ess yas i	1162				U	,	K 40		0.00	(70)
											Air chang	ges per hour
											0.16	(8)
Pressu	ıre test, r	esult q50	)						3.90			(17)
Air perr	meability										0.35	(18)
-											2.00	(19)
											0.85	(20)
Infiltrat	ion rate ii	ncorpora	ting shel	ter factor							0.30	(21)
Infiltrat	ion rate r	nodified t	for month	nly wind s	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 F	actor											
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)
Adjuste	ed infiltra	tion rate	(allowing	g for shelt	er and w	ind spee	ed)					
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)
Ventila	ition : nat	ural vent	tilation, ir	ntermitte	nt extract	t fans						,
Effectiv	ve air cha	nge 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 Element		and hea Gross area, m²	Ope	n <b>ramete</b> enings	r Netarea A, m²		J-value V/m²K	A x U W/K		kappa-value kJ/m²K	e AxK kJ/K	
	led, low- t (East)	e-glazed, E, En=0.			12.67		.05 (1.10)		.35			(27)
	led, low- t (West)	e-glazed, E, En=0.	1,		5.47	0 1	.05 (1.10)	5	.76			(27)
	glazed, a En=0.1, s	argon fille	d,		3.92	0	1.10	4	.31			(26)
Walls HALLV	<b>N/ N V</b>				22.62	2 0	.13 (Ru=0	.82) 3	.02	70.00	1583.40	(29)
Walls					36.50	0	0.15	5	.47	70.00	2555.00	(29)
Party wa	all	VINDOW	'S&DOC	ORS	16.69	9	0.00	0	.00	180.00	3004.20	)
SOLID Party flo					76.96	ô	0.00	0	.00	40.00	3078.40	)
Party ce	iling	/ELLING /ELLING			76.96	6	0.00	0	.00	30.00	2308.80	)
Fabric h Heat cap Thermal Effect of Total fab	eat loss pacity I mass pa thermal oric heat	arameter bridges	, kJ/m²K		n²						81.18 31.92 12529.80 162.81 6.50 38.42	2 (33) 0 (34) 1 (35) 0 (36)
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 tra	nsfer co	efficient,	W/K		Л	,						
74.89	74.71	74.53	73.71	73.56	72.84	72.84	72.71	73.12	73.56	73.87	74.20	
Heat los	s param	eter (HLI	P), W/m²	K							73.7	l (39)
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 (ave		in month	(Table 1	a)		JI.	II.			II.	0.96	6 (40)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
31	28	31	30	31	30	31	31	30	31	30	31	

Assume	e <b>r heatin</b> g ed occupa average l	ancy, N	-		er day Vd	,average	e				<b>kWh/year</b> 2.40 96.07	(4 (4
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot wate	er usage	in litres p	per day fo	or each r	nonth	,			,	,		
105.67	101.83	97.99	94.14	90.30	86.46	86.46	90.30	94.14	97.99	101.83	105.67	(4
Energy	content c	of hot wat	er 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	
	content (a	annual)									1511.50	(4
23.51	20.56	21.21	18.50	17.75	15.31	14.19	16.28	16.48	19.20	20.96	22.76	(4
store I	oss dete	rmined fr	om EN 1	3203-21	tests, tak	en from	boiler da	ta record	t			
Volume Tempera	ature fact	or	,	h/day)							0.00 0.0000 0.0000 0.0000 0.00	(5) (5) (6)
0.	lost from orage los	`	/vn/day)								0.00	(5
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
	age loss	J	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(-
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
Primary		1		1	1	1		1	1 2122			`
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
Combi le	oss calcu	lated for	each mo	onth		JI			JL	JI		`
26.47	23.89	26.39	25.45	26.24	25.33	26.13	26.20	25.40	26.33	25.56	26.45	(6
Total he	at require	ed for wa	ter heatii	ng calcul	ated for	each mo	nth		JI	JI		
183.18	160.95	167.82	148.76	144.56	127.42	120.74	134.77	135.26	154.36	165.32	178.21	(6
Output f	rom wate	er heater		ļ	J		JI		JL	JI		`
183.18	160.95	167.82	148.76	144.56	127.42	120.74	134.77	135.26	154.36	165.32	178.21	(6
	JL	JL	JL	I	JL	JL			JI	IL	1821.32	(6
											1021.32	٠,
Heat ga	ins from	water he	ating, kW	/h/month	1						1021.02	,,

:)_	Internal	uanis

0	iai gaiii	<u> </u>	1		,	1	1		1	1		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabol	ic 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)
Appliand	ces gains	3										
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 a	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. evap	oration (r	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 he	eating ga	ains						^	,	J.		
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 into	ernal gai	ns	,			<u>,                                    </u>			JI.	Щ		
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)
En=0.1, FRON' Window En=0.1, REAR Full glaz low-E, E REAR	soft coar T - Double soft coar red door En=0.1, s	e-glazed, it (West) - Double- soft coat	argon fil -glazed, a (West)	led, low-l	E, 0.9 E, 0.9	x 5.470 ′	19.64 č	g & FF ).63 x 0.8 ).63 x 0.8 ).63 x 0.8	30 O	hading .77 .77 .77	Gains 86.9136 37.5231 26.8904	
	Ū	, January	/								151.33	(83-1)
Solar ga 151.33 Total ga	296.03	487.52	711.01	871.37	892.00	849.23	729.47	567.00	351.26	188.69	124.44	(83)
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	_		("	ا دا ادما	Area		Ç	) ) 00		F x Shad	•	
En=0.1, FRON	soft coa T	. ,	-		,	x 12.67		0.80		.80 x 0.8		
Window En=0.1,		e-glazed, it (West)	argon fil	led, low-	E, 0.9	x 5.47	C	0.80	0	80 x 0.8	3 2.62	

REAR

	n interna	•		da in tha	li do a oro	o Th1/0	C)				24.00
	rature du g system i	•	<b>.</b>	us in the	iving are	a, mi (	C)				21.00 1.00
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau		]					_ 3	11			
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	10.00	100						1			
4.10	4.11	4.11	4.15	4.15	4.19	4.19	4.19	4.17	4.15	4.14	4.13
	on factor			L			0	1			
0.96	0.92	0.83	0.67	0.50	0.35	0.25	0.29	0.49	0.78	0.93	0.97
Mean ir	nternal tei			<u> </u>	J				1		
19.97	20.24	20.57	20.85	20.96	20.99	21.00	21.00	20.97	20.77	20.32	19.92
	rature du					JL			1		
20.11	20.11	20.11	20.12	20.12	20.13	20.13	20.13	20.13	20.12	20.12	20.11
	on factor								1		
0.95	0.90	0.81	0.64	0.46	0.30	0.20	0.24	0.43	0.74	0.91	0.96
Mean ir	nternal te	 mperatui	re in the r	est of dw	J	2			J.	JI	
18.76	19.13	19.59	19.95	20.08	20.12	20.13	20.13	20.10	19.87	19.26	18.69
Living a	rea fracti	on (34.89	9/76.96)		J	JI	JI		JI	JI	0.45
Mean ir	nternal ter	mperatur	e (for the	whole d	welling)						
19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24
Apply a	djustmer	nt to the n	nean inte	rnal tem	perature	, where a	ppropria	ite	J		
19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24
	·				-				•		·
0 0											
	Feb	Mar	10	Mov	ميا ا	l. d	۸۰۰۰	Con	Oct	Nov	Doo
Jan Utilicati	on factor		Apr	May	Jun	Jul	Aug	Sep	Oct	INOV	Dec
0.94			nr	0.47	0.22	0.00	0.00	0.40	0.75	0.00	0.05
	0.90	0.80	0.65	0.47	0.32	0.23	0.26	0.46	0.75	0.90	0.95
Useful (		044.00	775.00	CO0 04	400.00	205.20	200.05	457.00	C11 10	CO7 40	CO4.05
657.20				628.94	428.36	285.28	298.95	457.30	611.19	627.12	624.25
	average		,		44.00	40.00	40.40	4440	40.00	7.40	4.00
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20
	ss rate fo					005.70	000 75	107.00	740.45	000.00	144000
	5 1100.70			645.97	431.06	285.73	299.75	467.86	712.15	933.89	1116.22
	n of mont			14.00	1				1.00	14.00	
1.00	1.00	1.00	1.00	1.00	- 130/11/	-		<u> </u> -	1.00	1.00	1.00
•	heating re		no.		n, KVVh/m	onth			ı	1000 55	1000 55
347.41			50.12	12.67	-	-	<u> </u> -	Ţ <u></u>	75.11	220.88	366.02
	pace heat	•		•	`	ar) (Octo	ber to Ma	ay)			1453.34
space i	heating re	equireme	ent per m	- (KVVN/M	-/year)						18.88

### 8c. Space cooling requirement - not applicable

9a. Energy requirements	
-------------------------	--

9a. Energ	ıy requ	irement	ts								kWh/year	
No second Fraction of Efficiency	f space	heat fro	m main :	system(s	s)				1.0000 3.20%			(202) (206)
Jan F	eb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space hea	ating red	quireme	nt			J			J	J.		
347.41 2	34.52	146.61	50.12	12.67	-	-	-	-	75.11	220.88	366.02	(98)
Appendix (	Q - mo	nthly en	ergy save	ed (main	heating	system 1	1)		J	J.		
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space hea	ating fu	el (main	heating	system 1	ĺ)	,	А		,	.H.		
372.76 2	51.63	157.31	53.77	13.59	-	-	-	-	80.59	237.00	392.73	(211)
Appendix (	Q - mo	nthly ene	ergy save	ed (main	heating	system 2	2)	,	Л	,		
0.00	0.00	0.00	0.00	0.00	-	-	-	<b>T-</b>	0.00	0.00	0.00	(212)
Space hea	ating fu	el (main	heating	system 2	2)	JL			J	J		
0.00	0.00	0.00	0.00	0.00	<b> </b> -	-	-	<b> </b> -	0.00	0.00	0.00	(213)
Appendix (	Q - moi	nthly ene	ergy save	ed (seco	ndary he	ating sys	stem)		J	J		
0.00	0.00	0.00	0.00	0.00	<b> </b> -	-	-	<b> </b> -	0.00	0.00	0.00	(214)
Space hea	ating fue	el (secor	dary)			JL	JL		JL	JL		
0.00	.00	0.00	0.00	0.00	<b> </b> -	-	-	<b> </b> -	0.00	0.00	0.00	(215)
Water hea	ting				J	JI	JL		JL	JL		
Waterhea	ting rec	Juiremer	nt									
183.18 1	60.95	167.82	148.76	144.56	127.42	120.74	134.77	135.26	154.36	165.32	178.21	(64)
Efficiency	of wate	r heater									87.30	(216)
89.18	9.00	88.63	88.01	87.53	87.30	87.30	87.30	87.30	88.23	88.94	89.23	(217)
Water hea	ting fue	el				J			J	J.		
205.41 1	80.84	189.35	169.02	165.16	145.96	138.30	154.37	154.93	174.95	185.88	199.72	(219)
Annual total Space hea Space hea	ating fu ating fu	el (secor	-	stem 1							kWh/year 1559.38 0.00	(211) (215)
Water hea	-				_						2063.90	(219)
Electricity central he boiler with	eating p	oump		ectric kee	ep-hot						30.00 45.00	(230c) (230e)
Total elect				n/vear							75.00	(231)
Electricity Energy sav Appendix	for ligh ving/ge Q -	ting (100 neration	).00% fix technolo	ed LEL)							335.31	(232)
Energy s Energy ι			ited ():								0.000 0.000	(236a) (237a)
Total deliv	V		all uses								4033.58	(238)

10a	Fuel	costs	เมรากต	Table	12	prices
ıva.	ruei	CUSIS	usiiiu	I avie	12	DIICES

kWh/year Fuel price £/year	
p/kWh	
Space heating - main system 1 1559.377 3.480 54.27	(240)
Space heating - main system 2 0.000 0.000 0.000	` ,
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 0.000	(252)
Appendix Q -	
Energy saved or generated (): 0.000 0.000 0.000	(253)
Energy used (): 0.000 0.000 0.000	` ,
Total energy cost 300.2°	(255)
11a. SAP rating	
0.42	(256)
1.0	
SAP value 85.58	` '
86	(258)
SAP band	, ,

#### 12a. Carbon dioxide emissions

	Energy	<b>Emission factor</b>	<b>Emission</b>	S
	kWh/year	kg CO2/kWh	kg CO2/y	ear
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)
Waterheating	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/yea	ar
CO2 emissions per m <sup>2</sup>			12.94	(273)
Elvalue			89.06	(273a)
El rating			89	(274)
El band			В	

## Calculation of stars for heating and DHW

Main heating energy efficiency
Main heating environmental impact
Water heating energy efficiency
Water heating environmental impact

 $(3.48 / 0.9020) \times (1 + (0.29 \times 0.00)) = 3.8581$ , stars = 4  $(0.2160 / 0.9020) \times (1 + (0.29 \times 0.00)) = 0.2395$ , stars = 4 3.48 / 0.8816 = 3.9473, stars = 4 0.2160 / 0.8816 = 0.2450, stars = 4

#### Page 8 of 10

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Approval of JPA Designer by BRE applies only to the software, data is not subject to quality control procedures, users are themselves responsible for the accuracy of the data. The results of the calculation should not be accepted without first checking the input data.

## **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

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

2b Fabric U-values

Element **Highest** <u>Average</u> 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 1.10 (max. 2.00) 1.10 (max. 3.30) **Openings** OK

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-

Page 9 of 10

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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

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):

Slight OK

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/m<sup>2</sup>K

Walls U-value 0.13 W/m<sup>2</sup>K

Design air permeability 3.9 m<sup>3</sup>/h.m<sup>2</sup>

### **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	Av. Storey	Volume	
	(m²)	height (m)	(m³)	
First floor	76.96	2.51	193.17	(3a)
	76.96			(4)
			193.17	(5)

#### 2. Ventilation rate

											m³ per ho	our
							main + s	eondar	y + othe	er		
Numbe	er of chim	nave					heating $0 + 0 + 0$	, ,	k 40		0.00	(6a)
	er of oper	•					0 + 0 + 0		k 40 k 20		0.00	(6b)
	er of inter		ne				3		k 10		30.00	(7a)
	er of pass		_				0		k 10		0.00	(7a) (7b)
	er of fluel						0		k 40		0.00	(7b) (7c)
Numbe	ei oi iiueii	ess yas i	1162				U	,	K 40		0.00	(70)
											Air chang	ges per hour
											0.16	(8)
Pressu	ıre test, r	esult q50	)						3.90			(17)
Air perr	meability										0.35	(18)
-											2.00	(19)
											0.85	(20)
Infiltrat	ion rate ii	ncorpora	ting shel	ter factor							0.30	(21)
Infiltrat	ion rate r	nodified t	for month	nly wind s	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 F	actor											
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)
Adjuste	ed infiltra	tion rate	(allowing	g for shelt	er and w	ind spee	ed)					
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)
Ventila	ition : nat	ural vent	tilation, ir	ntermitte	nt extract	t fans						,
Effectiv	ve air cha	nge 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 Element		and hea Gross area, m²	О́ре	n <b>ramete</b> i enings	r Netarea A, m²		J-value V/m²K	A x U W/K		kappa-value kJ/m²K	e A x K kJ/K	
	led, low- t (West)	e-glazed, E, En=0.			5.47		.05 (1.10)		76		NOTT	(27)
	led, low- t (East)	e-glazed, E, En=0.	1,		12.67	0 1	.05 (1.10)	13.	35			(27)
	glazed, a En=0.1, s	rgon fille	d,		3.92	0	1.10	4.	31			(26)
Walls HALLV	<b>N/ N V</b>				22.62	2 0	.13 (Ru=0	.82) 3.	02	70.00	1583.4	0 (29)
Walls					36.50	0	0.15	5.	47	70.00	2555.0	0 (29)
	EXTERNAL#WINDOWS & DOORS Party wall					9	0.00	0.	00	180.00	3004.2	0
SOLID					76.96	6	0.00	0	00	40.00	3078.4	<b>n</b>
Party flo ANOT		/ELLING	BELOW		76.90	0	0.00	0.	00	40.00	3076.4	J
Party ce ANOT	_	/ELLING	ABOVE		76.96	6	0.00	0.	00	30.00	2308.8	0
Total are	ea of ext	ernal ele	ments Si	gma A, r	m²						81.1	8 (31)
	eat loss	, W/K									31.9	` ,
Heat cap			. I. I/ma 21/								12529.8	` ,
	i mass pa thermal	arameter	, KJ/M²K								162.8 6.5	` ,
	oric heat	_									38.4	` ,
		loss calc	ulated m	onthly							00.1	_ (0.)
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 tra	nsfer co	efficient,	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	
Heat los	s param	eter (HLI	P), W/m²	K							73.7	1 (39)
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 (ave	erage)		JI.								0.9	6 (40)
Number	of days	in month	(Table 1	a)								
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
31	28	31	30	31	30	31	31	30	31	30	31	

Assume	e <b>r heatin</b> g ed occupa average l	ancy, N	-		er day Vd	,average	e				<b>kWh/year</b> 2.40 96.07	(4 (4
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot wate	er usage	in litres p	per day fo	or each r	nonth	,			,	,		
105.67	101.83	97.99	94.14	90.30	86.46	86.46	90.30	94.14	97.99	101.83	105.67	(4
Energy	content c	of hot wat	er 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	
	content (a	annual)									1511.50	(4
23.51	20.56	21.21	18.50	17.75	15.31	14.19	16.28	16.48	19.20	20.96	22.76	(4
store I	oss dete	rmined fr	om EN 1	3203-21	tests, tak	en from	boiler da	ta record	t			
Volume Tempera	ature fact	or	,	h/day)							0.00 0.0000 0.0000 0.0000 0.00	(5) (5) (6)
0.	lost from orage los	`	/vn/day)								0.00	(5
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
	age loss	J	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(-
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
Primary		1			1	1		1	1 2122			`
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
Combi le	oss calcu	lated for	each mo	nth		JI			JL	JI		`
26.47	23.89	26.39	25.45	26.24	25.33	26.13	26.20	25.40	26.33	25.56	26.45	(6
Total he	at require	ed for wa	ter heatii	ng calcul	ated for	each mo	nth		JI	JI		
183.18	160.95	167.82	148.76	144.56	127.42	120.74	134.77	135.26	154.36	165.32	178.21	(6
Output f	rom wate	er heater		L	J		JI		JL	JI		`
183.18	160.95	167.82	148.76	144.56	127.42	120.74	134.77	135.26	154.36	165.32	178.21	(6
	JL	JL	JL	L	JL	JL			JI	JL	1821.32	(6
											1021.32	٠,
Heat ga	ins from	water he	ating, kW	/h/month	1						1021.02	,,

	rna	

	aı yanı	•									
Jan I	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
/letabolic	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
_ighting g	jains										
47.47	42.16	34.29	25.96	19.40	16.38	17.70	23.01	30.88	39.21	45.76	48.79
Appliance	es gains	3									
317.87	321.16	312.85	295.16	272.82	251.83	237.80	234.50	242.81	260.51	282.85	303.84
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
oumps ar	nd 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
osses e.	g. evap	oration (r	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
Nater he	ating ga	ins	•								
78.93	76.70	72.07	65.78	61.69	55.94	51.06	57.32	59.55	66.06	73.41	76.71
Γotal inte	rnal gai	ns	, i		,,	JI.	Д		,	J(	
547.13	542.90	522.08	489.77	456.79	427.02	409.43	417.70	436.12	468.65	504.90	532.21
En=0.1, s REAR Window - En=0.1, s FRONT Full glaze ow-E, En REAR Fotal sola	Double soft coa ed door- n=0.1, s	e-glazed, t (East) Double- oft coat	-glazed, a (West)					0.63 x 0.8		.77 .77	26.8904 151.33
Solar gair	าร										
	296.03	487.52	711.01	871.37	892.00	849.23	729.47	567.00	351.26	188.69	124.44
Fotal gain			70				7	V		10	
698.46	838.92	1009.60	1200.78	1328.16	1319.03	1258.66	1147.18	1003.12	819.92	693.58	656.65
Lighting	calcula	ations									
A.C. alasso		auons			_				_		
/vindow - En=0.1, s REAR		-glazed,	argon fil	led, low-	Area E, 0.9	a x 5.47	9	) ).80		F x Shad .80 x 0.8	-

	n interna	•		da in tha	living oro	o Th1/0	C)				24.00
	rature du g system i	•	٠.	us in the	iiving are	a, mi (	C)				21.00 1.00
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau		] ******	· •		1		11119	1			
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	10.00	10.70		17.102				11.00			10.01
4.10	4.11	4.11	4.15	4.15	4.19	4.19	4.19	4.17	4.15	4.14	4.13
	on factor			L			0	1			0
0.96	0.92	0.83	0.67	0.50	0.35	0.25	0.29	0.49	0.78	0.93	0.97
Mean ir	nternal te			<u> </u>					1		,
19.97	20.24	20.57	20.85	20.96	20.99	21.00	21.00	20.97	20.77	20.32	19.92
	rature du					JL			1		
20.11	20.11	20.11	20.12	20.12	20.13	20.13	20.13	20.13	20.12	20.12	20.11
	on factor								J		
0.95	0.90	0.81	0.64	0.46	0.30	0.20	0.24	0.43	0.74	0.91	0.96
	nternal te			est of dw					JL		
18.76	19.13	19.59	19.95	20.08	20.12	20.13	20.13	20.10	19.87	19.26	18.69
Living a	rea fracti	on (34.89		ļ		JI			J.	JI	0.45
Mean ir	nternal tei	mperatur	e (for the	whole d	welling)						
19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24
Apply a	djustmer	nt to the n	nean inte	rnal tem	perature	, where a	ppropria	ite	J		
19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24
	·								•		
0 0											
	Feb	Mar	10	Mov	lun .	l. d	۸۰۰۰	Con	Oct	Nov	Doc
Jan Utilicati	on factor		Apr	May	Jun	Jul	Aug	Sep	Oct	INOV	Dec
0.94		· ·	10	0.47	0.00	0.00	0.00	0.40	0.75	0.00	0.05
	0.90	0.80	0.65	0.47	0.32	0.23	0.26	0.46	0.75	0.90	0.95
Useful (		044.00	775.00	CO0 04	400.00	205.20	200.05	457.00	C11 10	CO7 40	CO4.05
657.20				628.94	428.36	285.28	298.95	457.30	611.19	627.12	624.25
	average				44.00	40.00	40.40	4440	40.00	7.40	1.00
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20
	ss rate fo					005.70	000 75	107.00	740.45	000.00	1440.00
	5 1100.70			645.97	431.06	285.73	299.75	467.86	712.15	933.89	1116.22
	n of mont	ı		14.00	1				1.00	14.00	14.00
1.00	1.00	1.00	1.00	1.00	- 130/11/	-		<u> </u> -	1.00	1.00	1.00
•	heating re	•	ir.		n, KVVh/m	onth			ı <b>— -</b>	1000 55	1000 55
347.41			50.12	12.67	-	-	<u> </u> -	Ţ <u></u>	75.11	220.88	366.02
	bace heat	•		•	`	ar) (Octo	ber to Ma	ay)			1453.34
space i	heating re	equireme	ant ber m	- (KVVII/M	r/year)						18.88

### 8c. Space cooling requirement - not applicable

9a. Energy red	quiremen	ts									
No secondary	neating sv	rstem sel	ected							kWh/year	
Fraction of spa				s)				1.0000			(202)
Efficiency of ma	ain heatin	g system	ı				9	3.20%			(206)
Jan Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating I	equireme	ent									
347.41 234.52	2 146.61	50.12	12.67	-	-	_	-	75.11	220.88	366.02	(98)
Appendix Q - m	onthly en	ergy sav	ed (main	heating	system 1	1)					
0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space heating	fuel (mair	heating	system 1	1)							
372.76 251.63	3 157.31	53.77	13.59	-	-	-	-	80.59	237.00	392.73	(211)
Appendix Q - m	onthly en	ergy sav	ed (main	heating	system 2	2)					
0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212)
Space heating	fuel (mair	heating	system 2	2)			•	,			
0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendix Q - m	onthly en	ergy sav	ed (seco	ndary he	ating sys	stem)		J.			
0.00 0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space heating	fuel (seco	ndary)									
0.00 0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Waterheating											
Water heating r	equireme	nt									
183.18 160.9	167.82	148.76	144.56	127.42	120.74	134.77	135.26	154.36	165.32	178.21	(64)
Efficiency of wa	iter heate	r								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 f	uel									-	
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 sy	stem 1							1559.38	(211)
Space heating	•	ndary)								0.00	(215)
Water heating f		o and ala	otrio kor	n hot						2063.90	(219)
Electricity for p central heating	-	is allu ele	CUIC KEE	p-not						30.00	(230c)
boiler with a fa		d flue								45.00	(230e)
Total electricity										75.00	(231)
Electricity for lig			,							335.31	(232)
Energy saving/g PVs 0.80 x 0										647.715	
PVs 0.80 x 0										0.000	
PVs 0.80 x 0										0.000	
										647.715	(233)
Appendix Q -	-										(000 )
Energy used	-	ated ():								0.000 0.000	(236a)
Energy used	().									0.000	(237a)
Total delivered	energy fo	r all uses								3385.87	(238)

10a	Fuel	costs	เมรากต	Table	12	prices
ıva.	ruei	CUSIS	usiiiu	Iabie	12	DIICES

rod. I del ocolo dollig Tuble 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)
SAPvalue			89.68	
			90	(258)
SAP band			В	

#### 12a. Carbon dioxide emissions

Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year		
1559.38	0.216	336.83	(261)	
0.00	0.000	0.00	(262)	
0.00	0.519	0.00	(263)	
2063.90	0.216	445.80	(264)	
		782.63	(265)	
75.00	0.519	38.93	(267)	
335.31	0.519	174.02	(268)	
-647.71	0.519	-336.16	(269)	
0.00	0.000	0.00	(269)	
0.00	0.000	0.00	(270)	
0.00	0.000	0.00	(271)	
		659.41	(272)	
		kg/m²/year		
		8.57	(273)	
		92.75	(273a)	
		93	(274)	
		Α		
	kWh/year 1559.38 0.00 0.00 2063.90 75.00 335.31 -647.71 0.00	kWh/year         kg CO2/kWh           1559.38         0.216           0.00         0.000           0.00         0.519           2063.90         0.519           335.31         0.519           -647.71         0.519           0.00         0.000	kWh/year         kg CO2/kWh         kg CO2/y           1559.38         0.216         336.83           0.00         0.000         0.00           0.00         0.519         0.00           2063.90         0.216         445.80           782.63         782.63           75.00         0.519         38.93           335.31         0.519         174.02           -647.71         0.519         -336.16           0.00         0.000         0.00           0.00         0.000         0.00           0.00         0.000         0.00           659.41         kg/m²/yea           8.57         92.75           93	

## Calculation of stars for heating and DHW

Main heating energy efficiency
Main heating environmental impact
Water heating energy efficiency
Water heating environmental impact

 $(3.48 / 0.9020) \times (1 + (0.29 \times 0.00)) = 3.8581$ , stars = 4  $(0.2160 / 0.9020) \times (1 + (0.29 \times 0.00)) = 0.2395$ , stars = 4 3.48 / 0.8816 = 3.9473, stars = 4 0.2160 / 0.8816 = 0.2450, stars = 4

#### Page 8 of 10

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Approval of JPA Designer by BRE applies only to the software, data is not subject to quality control procedures, users are themselves responsible for the accuracy of the data. The results of the calculation should not be accepted without first checking the input data.

## **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

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

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

2b Fabric U-values

Element **Highest** <u>Average</u> 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 1.10 (max. 2.00) 1.10 (max. 3.30) **Openings** OK

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-

Page 9 of 10

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5 Cylinder insulation

Hot water storage No cylinder

6 Controls

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

Time and temperature zone control Space heating controls

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 OK

Slight

Based on:

Thermal mass parameter: 162.81

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

Orientation: East

Ventilation rate:

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/m<sup>2</sup>K

Walls U-value 0.13 W/m2K

Design air permeability 3.9 m<sup>3</sup>/h.m<sup>2</sup>

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 (m²)	Av. Storey height (m)	Volume (m³)	
Secondfloor	76.60	2.50	191.50	(3a)
	76.60			(4)
			191.50	(5)

### 2. Ventilation rate

											m³ per ho	our
							main + s	eondar	y + othe	er		
Numbe	er of chim	nevs					0 + 0 + 0	) >	< 40		0.00	(6a)
	er of open	•					0 + 0 + 0		< 20		0.00	(6b)
	er of inter		ıns				3		<b>κ</b> 10		30.00	(7a)
Numbe	er of pass	ive vents					0	)	<b>&lt;</b> 10		0.00	(7b)
Numbe	er of fluele	ess gas fi	ires				0	>	<b>&lt;</b> 40		0.00	(7c)
											Air chang	jes per hour
											0.16	(8)
	ire test, r		)						3.90			(17)
Air perr	meability										0.35	(18)
											2.00	(19)
											0.85	(20)
	ion rate ir	•	_								0.30	(21)
Infiltrat	ion rate n	nodified f	or month	nly wind s	peed							
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	
Wind F	actor										52.50	(22)
	- ir	4.00	4.40	4.07	0.05	0.05	0.00	4.00	4.07	4.40	4.40	
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
Adjuste	ed infiltra	tion rate	(allowing	for shelt	er and w	ind spee	ed)				13.13	(22a)
0.38	0.37	0.37	0.33	0.32	0.28	0.28	0.28	0.30	0.32	0.34	0.35	
0.00	0.07	0.07	0.00	0.02	0.20	0.20	0.20	0.00	0.02	0.04	3.92	(22h)
Ventila	tion : nat	ural vent	ilation in	termitte	nt Avtract	fanc					3.92	(22b)
	ve air cha		nation, II	itemillei	ii exiiaci	. 14115						
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 Element		and hea Gross area, m²	Ope	n <b>ramete</b> i enings	r Netarea A, m²		l-value V/m²K	A x U W/K		kappa-value kJ/m²K	e A x K kJ/K	
	led, low- t (West)	e-glazed, E, En=0.			5.47		.05 (1.10)		76		NOTT	(27)
	led, low- t (East)	e-glazed, E, En=0.	1,		12.67	0 1	.05 (1.10)	13.	35			(27)
Double-	in=0.1, s	argon fille	d,		3.92	0	1.10	4.	31			(26)
Walls HALLV	ΛΙΔΥ				22.60	0 0	.13 (Ru=0	.82) 3.	02	70.00	1582.0	0 (29)
Walls					36.24	4	0.15	5.	44	70.00	2536.8	0 (29)
EXTER Party wa SOLID	all	VINDOW	'S & DOC	)RS	16.60	3	0.00	0.	00	180.00	2993.4	0
Party flo	or				76.60	0	0.00	0.	00	40.00	3064.0	0
Party ce	iling	/ELLING /ELLING			76.60	0	0.00	0.	00	30.00	2298.0	0
Fabric h Heat cap Thermal Effect of Total fab	eat loss pacity I mass pa thermal oric heat	arameter bridges	, kJ/m²K		m²						80.9 31.8 12474.2 162.8 6.5 38.3	8 (33) 0 (34) 5 (35) 0 (36)
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 tra	nsfer co	efficient,	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	- ()
Heat los	s param	eter (HLI	P), W/m²	K							73.3	9 (39)
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 (ave		in month	(Table 1	a)		,	,	^	,	"	0.9	6 (40)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
31	28	31	30	31	30	31	31	30	31	30	31	

Assume	er heating ed occupa average l	ancy, N	•		er day Vd	l,average	e				<b>kWh/year</b> 2.40 95.88	(42 (43
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot wat	er usage	in litres	oer day f	or each r	nonth							
105.47	101.63	97.80	93.96	90.13	86.29	86.29	90.13	93.96	97.80	101.63	105.47	(4
Energy	content o	of hot wat	ter 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	
	content (a	annual)									1508.56	(4
23.46	20.52	21.17	18.46	17.71	15.28	14.16	16.25	16.45	19.17	20.92	22.72	(4
store I	oss dete	rmined fr	om EN 1	3203-2	tests, tak	en from	boiler da	ta record	d			
			, ,,,,,,,								0.00	(5
Hot wat Volume	er cylinde	er loss fa	ctor (kW	h/day)							0.0000 0.0000	(5
	ature fact	or									0.0000	(5 (5
	lost from		Wh/day)								0.00	(5
0,	orage los	,	,									`
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
Net stor	age 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	(5
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	(5
Combi l	oss calcu	lated for	each mo	onth	,	JI.	Л		JI.	JI.		
26.47	23.88	26.38	25.45	26.24	25.33	26.13	26.20	25.39	26.32	25.56	26.44	(6
Total he	at require	ed for wa	ter heati	ng calcul	ated for	each mo	nth		JI.	JI.		
182.87	160.68	167.54	148.52	144.33	127.22	120.55	134.55	135.04	154.11	165.04	177.91	(6
Output f	from wate	er heater	for each	month, l	kWh/mor	nth	JI.	я	JL	JL		
182.87	160.68	167.54	148.52	144.33	127.22	120.55	134.55	135.04	154.11	165.04	177.91	(6
		JL	JI.		JL	JL	JI		JL	JL	1818.37	(6
Heat ga	ins from	water he	ating, kW	/h/month	า							•
58.62	51.45	53.53	47.28	45.82	40.21	37.93	42.58	42.81	49.07	52.77	56.97	(6
		*					~			~		

_	Intornal	MAINA
:)_	Internal	uanis
•		940

o. micoi							1 -		I	1	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabo	lic 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
Lighting	ggains										
47.29	42.00	34.16	25.86	19.33	16.32	17.64	22.92	30.77	39.07	45.60	48.61
Applian	ces gains	S	_						_		
316.70	319.99	311.70	294.07	271.82	250.90	236.93	233.64	241.92	259.55	281.81	302.73
Cookin	g 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
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
Losses	e.g. evap	oration (ı	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
Water h	eating ga	ains									
78.79	76.57	71.95	65.67	61.59	55.85	50.98	57.23	59.45	65.95	73.29	76.58
Total int	ternal gai	ns									
545.45	541.23	520.48	488.27	455.41	425.74	408.21	416.46	434.81	467.24	503.36	530.58
Window En=0.1 REAR		e-glazed, it (West)	argon fil	led, low-	Area E, 0.9	a & Flux x 5.470 ′	19.64 C	j & FF ).63 x 0.8	30 0	hading .77	Gains 37.5231
Window En=0.1 REAR Window En=0.1 FRON Full glaz low-E, E REAR	v - Double , soft coa t v - Double , soft coa IT zed door En=0.1, s	e-glazed, at (West) e-glazed, at (East) - Double- soft coat	argon fil argon fil -glazed, a (West)	led, low-	Area E, 0.9	x 5.470 <sup>^</sup> x 12.670	19.64 0 19.64 0	0.63 x 0.8	30 O	•	
Window En=0.1, REAR Window En=0.1, FRON Full glaz low-E, E REAR Total so Solar ga	v - Double , soft coa t v - Double , soft coa IT zed door En=0.1, s clar gains ains	e-glazed, at (West) e-glazed, at (East) - Double oft coat , January	argon fil argon fil -glazed, a (West)	led, low-	Area E, 0.9	x 5.470 <sup>2</sup> x 12.670 x 3.920 <sup>2</sup>	19.64 0 19.64 0	0.63 x 0.8	30 O	.77 .77 .77	37.5231 86.9136 26.8904
Window En=0.1 REAR Window En=0.1 FRON Full glaz low-E, I REAR Total so Solar ga 151.33	v - Double, soft coally soft coally zed door selection in the selection is a selection in the selection in t	e-glazed, at (West) e-glazed, at (East) - Double- soft coat , January	argon fil argon fil -glazed, a (West)	led, low-led, low-largon fille	Area E, 0.9 E, 0.9 ed, 0.9	x 5.470 <sup>2</sup> x 12.670 x 3.920 <sup>2</sup> 849.23	19.64 0 19.64 0 19.64 0	0.63 x 0.8 0.63 x 0.8 0.63 x 0.8	351.26	.77	37.5231 86.9136 26.8904 151.33
Window En=0.1. REAR Window En=0.1. FRON Full glaz ow-E, I REAR Total sc Solar ga 151.33	v - Double, soft coally soft coally zed door selection in the selection is a selection in the selection in t	e-glazed, at (West) e-glazed, at (East) - Double- soft coat , January	argon fil argon fil -glazed, a (West)	led, low-led, low-largon fille	Area E, 0.9 E, 0.9 ed, 0.9	x 5.470 <sup>2</sup> x 12.670 x 3.920 <sup>2</sup> 849.23	19.64 0 19.64 0 19.64 0	0.63 x 0.8 0.63 x 0.8 0.63 x 0.8	351.26	.77	37.5231 86.9136 26.8904 151.33
Window En=0.1 REAR Window En=0.1 FRON Full glaz low-E, I REAR Total so Solar ga 151.33	v - Double, soft coally soft coally zed door selection in the selection is a selection in the selection in t	e-glazed, at (West) e-glazed, at (East) - Double- soft coat , January	argon fil argon fil -glazed, a (West)	led, low-led, low-largon fille	Area E, 0.9 E, 0.9 ed, 0.9	x 5.470 <sup>2</sup> x 12.670 x 3.920 <sup>2</sup> 849.23	19.64 0 19.64 0 19.64 0	0.63 x 0.8 0.63 x 0.8 0.63 x 0.8	351.26	.77	37.5231 86.9136 26.8904 151.33
Window En=0.1, REAR Window En=0.1, FRON Full glaz low-E, E REAR Total so Solar ga 151.33 Total ga 696.78	v - Double, soft coally soft coally zed door selection in the selection is a selection in the selection in t	e-glazed, at (West) e-glazed, at (East) - Double- coft coat , January 487.52	argon fil argon fil -glazed, a (West)	led, low-led, low-largon fille	Area E, 0.9 E, 0.9 ed, 0.9	x 5.470 <sup>2</sup> x 12.670 x 3.920 <sup>2</sup> 849.23	19.64 0 19.64 0 19.64 0	0.63 x 0.8 0.63 x 0.8 0.63 x 0.8	351.26 818.50	.77 .77 .77 .188.69	37.5231 86.9136 26.8904 151.33 124.44
Window En=0.1; REAR Window En=0.1; FRON Full glaz low-E, E REAR Total so Solar ga 151.33 Total ga 696.78  Lightin Window	v - Double, soft coally y - Double, soft coally zed door selection in the	e-glazed, at (West) e-glazed, at (East) - Double-soft coat , January 487.52 1008.00 ations e-glazed,	argon fil argon fil -glazed, a (West) /	led, low-led, low-largon fillo	Area E, 0.9 E, 0.9 ed, 0.9  892.00 Area Area	x 5.470 ° x 12.670 x 3.920 ° 849.23	19.64 0 19.64 0 19.64 0 729.47	0.63 x 0.8 0.63 x 0.8 0.63 x 0.8 567.00	351.26 818.50	.77	37.5231 86.9136 26.8904 151.33 124.44 655.02

	<i>n interna</i> rature dui	•		ds in the	living are	a, Th1 (°	C)				21.00
Heating	g system r	esponsi	veness								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
Utilisati	on factor	for gains	for living	area		J(	.,		A.	, , , , , , , , , , , , , , , , , , ,	
0.96	0.92	0.83	0.67	0.50	0.35	0.25	0.29	0.49	0.78	0.93	0.96
Mean ir	nternal ter	mperatui	e in living	area T1		1					
19.98	20.24	20.57	20.85	20.96	20.99	21.00	21.00	20.97	20.77	20.32	19.92
Tempe	rature du	ring heat	ing perio	ds in rest	of dwelli	ng 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
Utilisati	on factor	for gains	for rest	of dwellir	ng	1			J		
0.95	0.90	0.81	0.63	0.45	0.30	0.20	0.24	0.43	0.74	0.91	0.96
Mean ir	nternal te	mperatu	re in the r	est of dw	elling T2	2			JI		
18.76	19.14	19.59	19.95	20.08	20.12	20.13	20.13	20.10	19.87	19.27	18.69
Living a	rea fracti	on (34.6	2/76.60)		JI				JI		0.45
Mean in	nternal ter	mperatur	e (for the	whole d	welling)						
19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24
Apply a	djustmen	nt to the n	nean inte	rnal tem	perature	, where a	appropria	ate	J		
19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24
8 Sna	ce heatin	na reaui	romont								
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	on factor			Iviay	Juli	Jul	rag	Тось	001	1400	DCC
0.94	0.90	0.80	0.64	0.47	0.32	0.23	0.26	0.45	0.74	0.90	0.95
Useful g		0.00	0.04	0.47	0.32	0.23	0.20	10.43	0.74	0.30	0.93
655.38		809.50	772.27	626.33	426.42	283.94	297.55	455.34	609.15	625.35	622.52
	/ average				420.42	203.94	297.55	455.54	609.15	023.33	022.32
	4.90	6.50	8.90		11.00	10.00	10.40	1110	40.00	7.40	14.20
4.30	ss rate fo			11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20
						004.00	000.04	405.70	700.05	000.00	14444 44
	5 1096.04			643.09	429.07	284.38	298.34	465.73	709.05	929.88	1111.41
	n of mont			4.00	1			Y	4.00	4.00	1.00
1.00	1.00	1.00	1.00	1.00	- 1-10/11/	-	-	-	1.00	1.00	1.00
	heating re		ir.		ı, KVVN/M	ionth	1	1	1-4	045.55	1000 = :
345.19		145.21	49.47	12.47	<u> -</u>	-	-	<u> -</u>	74.32	219.26	363.74
	pace heat	•		•	` •	ar) (Octo	ber to M	ay)			1442.41
opace r	heating re	equireme	ent ber m	- (KVVN/M	-/year)						18.83

### 8c. Space cooling requirement - not applicable

9a. Energy requirements

0.00

0.00

Water heating requirement

Efficiency of water heater

Water heating

0.00

0.00

0.00

	•	0 ,	stem sel									
Fraction	of space	e heat fro	m main	system(s	s)				1.0000			(202
Efficiend	y of mai	n heating	g system				93.20%					
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space h	eating re	quireme	nt							J		
345.19	232.75	145.21	49.47	12.47	-	-	-	-	74.32	219.26	363.74	(98)
Appendi	x Q - mo	nthly en	ergy save	ed (main	heating	system 1	1)			J		
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210
Space h	eating fu	el (main	heating	system 1	)				,			
370.38	249.73	155.80	53.08	13.38	-	-	-	-	79.74	235.26	390.28	(211
Appendi	x Q - mo	nthly en	ergy save	ed (main	heating	system 2	2)	•				
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(212
Space h	eating fu	el (main	heating	system 2	2)				,			
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213
Appendi	x Q - mo	nthly en	ergy save	ed (seco	ndary he	ating sys	stem)					
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214
Space h	eating fu	el (secor	ndary)		,	,	,		,	,		
	·	,		,		·						

0.00

0.00

0.00

87.30

4017.35

(238)

kWh/year

(215)

(64)

(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 h	eating fu	el		•	•			-				
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 t	totals										kWh/year	
Space h	eating fu	iel used,	main sy	stem 1							1547.65	(211)
•	eating fu		•								0.00	(215)
Water h	eating fu	el <sup>`</sup>	• /								2060.62	(219)
Electrici	ty for pur	mps, fan	s and ele	ctric kee	p-hot							
central	heating	pump									30.00	(230c)
boiler v	with a fan	-assiste	d flue								45.00	(230e)
Total ele	ectricity for	or the ab	ove, kWł	n/year							75.00	(231)
Electrici	ty for ligh	nting (100	0.00% fix	ed LEL)							334.08	(232)
Energys	saving/ge	eneration	technolo	ogies								
Append	ix Q -											
Energ	y saved o	or genera	ated ():								0.000	(236a)
Energ	y used ()	:									0.000	(237a)

182.87 | 160.68 | 167.54 | 148.52 | 144.33 | 127.22 | 120.55 | 134.55 | 135.04 | 154.11 | 165.04 | 177.91

Total delivered energy for all uses

10a	Fuel	costs	เมรากต	Table	12	prices
ıva.	ı ucı	CUSIS	usiiiu	Iabic	12	DIICES

rod. I der oosts dering Table 12 prioes				
	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	(2EC)
			0.42	(256)
CADvolue			1.03	(257)
SAPvalue			85.57	(250)
SAP band			86 B	(258)

#### 12a. Carbon dioxide emissions

	Energy	<b>Emission factor</b>	<b>Emission</b>	S
	kWh/year	kg CO2/kWh	kg CO2/y	ear
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)
Waterheating	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/yea	ar
CO2 emissions per m <sup>2</sup>			12.95	(273)
Elvalue			89.07	(273a)
El rating			89	(274)
El band			В	

# Calculation of stars for heating and DHW

Main heating energy efficiency
Main heating environmental impact
Water heating energy efficiency
Water heating environmental impact

 $(3.48 / 0.9020) \times (1 + (0.29 \times 0.00)) = 3.8581$ , stars = 4  $(0.2160 / 0.9020) \times (1 + (0.29 \times 0.00)) = 0.2395$ , stars = 4 3.48 / 0.8816 = 3.9474, stars = 4 0.2160 / 0.8816 = 0.2450, stars = 4

Page 8 of 10

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### **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

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

2b Fabric U-values

Element **Highest** <u>Average</u> 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 1.10 (max. 2.00) 1.10 (max. 3.30) **Openings** OK

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-

Page 9 of 10

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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

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):

Medium OK

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/m<sup>2</sup>K

Walls U-value 0.13 W/m<sup>2</sup>K

Design air permeability 3.9 m<sup>3</sup>/h.m<sup>2</sup>

### **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 (m²)	Av. Storey height (m)	Volume (m³)	
Secondfloor	76.60	2.50	191.50	(3a)
	76.60			(4)
			191.50	(5)

### 2. Ventilation rate

											m³ per ho	our
							main + s	eondar	y + othe	er		
Numbe	er of chim	nevs					0 + 0 + 0	) >	< 40		0.00	(6a)
	er of open	•					0 + 0 + 0		< 20		0.00	(6b)
	er of inter		ıns				3		<b>κ</b> 10		30.00	(7a)
Numbe	er of pass	ive vents					0	)	<b>&lt;</b> 10		0.00	(7b)
Numbe	er of fluele	ess gas fi	ires				0	>	<b>&lt;</b> 40		0.00	(7c)
											Air chang	jes per hour
											0.16	(8)
	ire test, r		)						3.90			(17)
Air perr	meability										0.35	(18)
											2.00	(19)
											0.85	(20)
	ion rate ir	•	_								0.30	(21)
Infiltrat	ion rate n	nodified f	or month	nly wind s	peed							
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	
Wind F	actor										52.50	(22)
	- ir	4.00	4.40	4.07	0.05	0.05	0.00	4.00	4.07	4.40	4.40	
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18	
Adjuste	ed infiltra	tion rate	(allowing	for shelt	er and w	ind spee	ed)				13.13	(22a)
0.38	0.37	0.37	0.33	0.32	0.28	0.28	0.28	0.30	0.32	0.34	0.35	
0.00	0.07	0.07	0.00	0.02	0.20	0.20	0.20	0.00	0.02	0.04	3.92	(22h)
Ventila	tion : nat	ural vent	ilation in	termitte	nt Avtract	fanc					3.92	(22b)
	ve air cha		nation, II	itemillei	ii exiiaci	. 14115						
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 l	losses	and hea	t loss pa	aramete	r							
Element		Gross		enings	Netare		U-value	ΑxU		kappa-valu		
\^ <i>(</i> :	Davidala	area, m²			A, m <sup>2</sup>		W/m <sup>2</sup> K	W/K		kJ/m²K	kJ/K	(07)
Window argon fill					12.67	U	1.05 (1.10)	13.	35			(27)
soft coat	-	·⊏, ⊑II=U.	. 1 ,									
FRONT												
Window-		e-glazed,			5.47	0	1.05 (1.10)	5.	76			(27)
argon fille							,					, ,
soft coat	(West)											
REAR												4
Full glaze					3.92	0	1.10	4.3	31			(26)
Double-g			ed,									
low-E, Ei (West)	n=0.1, s	soit coat										
REAR												
Walls					22.60	0	0.13(Ru=0.	82) 3.0	)2	70.00	1582.00	(29)
HALLW	VAY						•	,				` ,
Walls					36.2	4	0.15	5.4	44	70.00	2536.80	(29)
		VINDOW	/S&DOC	DRS								
Party wa	ıII				16.63	3	0.00	0.0	00	180.00	2993.40	)
SOLID Party floo	or.				76.60	0	0.00	0.0	20	40.00	3064.00	١
•		/ELLING	BELOW	,	70.00	U	0.00	0.0	JU	40.00	3004.00	,
Party cei		VLLLIIVO	DLLOW		76.60	0	0.00	0.0	00	30.00	2298.00	)
	_	<b>VELLING</b>	ABOVE			•						
Total are			ments Si	igma A, ı	m²						80.90	` ,
Fabric he		, W/K									31.88	` ,
Heat cap			1 1/ 014								12474.20	` '
Thermal			r, kJ/m²K								162.8	` ,
Effect of total fab											6.50 38.38	` ,
Ventilation			rulated m	onthly							30.30	3 (37)
36.19	36.01	35.83	35.01	34.86	34.15	34.15	5 34.01	34.42	34.86	35.17	35.50	(38)
			_	34.00	34.13	34.13	34.01	34.42	34.00	33.17	33.30	(30)
Heat tran				70.04	70.50	70.50	70.00	70.00	70.0	4 70.55	70.07	
74.57	74.39	74.21	73.39	73.24	72.53	72.53	3 72.39	72.80	73.24	73.55	73.87	(00)
Haatlaa		-4/111	D) \\//2	17							73.3	9 (39)
Heat loss	•		, .	,	1	1		1	7			
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 (ave			/T-1-1- 4	- \							0.90	6 (40)
Number			,	,	1.	1		1 -				
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
31	28	31	30	31	30	31	31	30	31	30	31	

Assume	e <b>r heatin</b> ed occupa average l	ancy, N	•		er day Vd	,average	e				<b>kWh/year</b> 2.40 95.88	(42) (43)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Hot water	er usage	in litres p	per day f	or each r	nonth	,			,			
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 c	of hot wat	er 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 of Distribut	content (a	annual)					•				1508.56	(45)
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 l	oss dete	rmined fr	om EN 1	3203-21	tests, tak	en from	boiler da	ta record	d			
											0.00	(50)
	er cylinde	er loss fa	ctor (kW	h/day)							0.0000	(51)
Volume	ractor ature fact	or									0.0000 0.0000	(52) (53)
	lost from		Nh/day)								0.00	(55)
0,	orage los	`	, , , , aay,								0.00	(00)
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 stor	age loss		JL			JL	JL		J	JL		
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	,	JL.		,	,	,		,	И		
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 lo	oss calcu	lated for	each mo	onth	,	JI.	Л		JI.	JI.		
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 he	at require	ed for wa	ter heati	ng calcul	ated for	each mo	nth		JI.	JL		
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 f	rom wate	er heater	for each	month, l	«Wh/mor	nth	JL		JL	JL		
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)
L	JI.	JL	JL	R	Л	JI.	JL		JL	JI	1818.37	(64)
Heat gai	ins from	water he	ating, kW	/h/month	1							
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)

 Internal	I CIAILIS

0	iai gaiii	•										
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Metabol	ic 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)
Appliand	ces gains	8										
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 a	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. evap	oration (r	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 he	eating ga	ains										
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 inte	ernal gai	ns										
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)
Window En=0.1, FRON Window En=0.1, REAR Full glaz low-E, E REAR	soft coa Fouble  soft coa  ed door	t (East) e-glazed, t (West) - Double-	argon fil	led, low-l	E, 0.9	x 5.470 ′	19.64 C	) & FF ).63 x 0.8 ).63 x 0.8 ).63 x 0.8	30 O	hading .77 .77	Gains 86.9136 37.5231 26.8904	
Total sol	lar gains	, January	1								151.33	(83-1)
Solar ga	ins											
151.33		487.52	711.01	871.37	892.00	849.23	729.47	567.00	351.26	188.69	124.44	(83)
Total gai			JL					1				( )
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)
<b>Lighting</b> Window	g calcul	ations		J	Area	JL	g	,	F	F x Shac .80 x 0.8	ding	` ,
En=0.1, FRON		t (East)										

0.80

 $0.80 \times 0.83$ 

2.62

En=0.1, soft coat (West)

REAR

Window - Double-glazed, argon filled, low-E, 0.9 x 5.47

	<i>n interna</i> rature dui	•		ds in the	living are	a, Th1 (°	C)				21.00
Heating	g system r	esponsi	veness								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
Utilisati	on factor	for gains	for living	area		JI.	.,		A.	<u>, , , , , , , , , , , , , , , , , , , </u>	
0.96	0.92	0.83	0.67	0.50	0.35	0.25	0.29	0.49	0.78	0.93	0.96
Mean ir	nternal ter	mperatui	e in living	area T1		1					
19.98	20.24	20.57	20.85	20.96	20.99	21.00	21.00	20.97	20.77	20.32	19.92
Tempe	rature du	ring heat	ing perio	ds in rest	of dwelli	ng 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
Utilisati	on factor	for gains	for rest	of dwellir	ng	1					
0.95	0.90	0.81	0.63	0.45	0.30	0.20	0.24	0.43	0.74	0.91	0.96
Mean ir	nternal te	mperatu	re in the r	est of dw	elling T2	2			JI		
18.76	19.14	19.59	19.95	20.08	20.12	20.13	20.13	20.10	19.87	19.27	18.69
Living a	rea fracti	on (34.6	2/76.60)		JI				JI		0.45
Mean in	nternal ter	mperatur	e (for the	whole d	welling)						
19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24
Apply a	djustmen	nt to the n	nean inte	rnal tem	perature	, where a	appropria	ate	J		
19.31	19.63	20.04	20.36	20.48	20.52	20.52	20.52	20.50	20.28	19.74	19.24
8 Sna	ce heatin	na reaui	romont								
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	on factor			Iviay	Juli	Jul	Aug	Тось	001	1400	DCC
0.94	0.90	0.80	0.64	0.47	0.32	0.23	0.26	0.45	0.74	0.90	0.95
Useful g		0.00	0.04	0.47	0.32	0.23	0.20	10.43	0.74	0.30	0.93
655.38		809.50	772.27	626.33	426.42	283.94	297.55	455.34	609.15	625.35	622.52
	/ average				420.42	203.94	297.55	455.54	609.15	023.33	022.32
	4.90	6.50	8.90		11.00	10.00	10.40	1110	40.00	7.40	14.20
4.30	ss rate fo			11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20
						004.00	000.04	405.70	700.05	000.00	14444 44
	5 1096.04			643.09	429.07	284.38	298.34	465.73	709.05	929.88	1111.41
	n of mont			4.00	1			Y	4.00	4.00	1.00
1.00	1.00	1.00	1.00	1.00	- 1-10/11/	-	-	-	1.00	1.00	1.00
	heating re		ir.		ı, KVVN/M	ionth	1	1	1-4	045.55	1000 = :
345.19		145.21	49.47	12.47	<u> -</u>	-	-	<u> -</u>	74.32	219.26	363.74
	pace heat	•		•	` •	ar) (Octo	ber to M	ay)			1442.41
opace r	heating re	equireme	ent ber m	- (KVVN/M	-/year)						18.83

### 8c. Space cooling requirement - not applicable

9a. Ene	ergy requ	uiremen	ts									
No seco	ondary he	eating sv	stem sel	ected							kWh/year	
	of space				s)				1.0000			(202)
Efficien	cy of mai	n heating	g system					9	3.20%			(206)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space h	neating re	quireme	nt									
345.19	232.75	145.21	49.47	12.47	-	-	-	-	74.32	219.26	363.74	(98)
Append	lix Q - mo	nthly en	ergy sav	ed (main	heating	system 1	1)					
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space h	neating fu	iel (main	heating	system 1	1)							
370.38	249.73	155.80	53.08	13.38	-	-	-	-	79.74	235.26	390.28	(211)
Append	lix Q - mo	nthly en	ergy sav	ed (main	heating	system 2	2)		,			
0.00	0.00	0.00	0.00	0.00	-	-	-	]-	0.00	0.00	0.00	(212)
Space h	neating fu	iel (main	heating	system 2	2)	JL	,	,	,	JI.		
0.00	0.00	0.00	0.00	0.00	<b> </b> -	-	-	<b>-</b>	0.00	0.00	0.00	(213)
Append	lix Q - mo	nthly en	ergy save	ed (seco	ndary he	ating sys	stem)		JL			
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
	neating fu	el (secor	ndary)		J.	JI	JL		JI	JI		` ,
0.00	0.00	0.00	0.00	0.00	-	-	-	<b>1</b> -	0.00	0.00	0.00	(215)
Waterh	_	JL	JL	J	J.	JI	JL		JL	JI		, ,
	eating re	quiremer	nt									
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)
Efficien	cy of wate	er heater				Л			,	Л	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)
Waterh	eating fu	el		,		Л	,		,	Л		
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	
	neating fu	ıel used,	main sy	stem 1							1547.65	(211)
	neating fu		ndary)								0.00	(215)
	eating fu										2060.62	(219)
	ity for pur	-	s and ele	ectric kee	p-hot						30.00	(230c)
	l heating with a fan		d flue								45.00	(230c) (230e)
	ectricity f			n/year							75.00	(231)
Electric	ity for ligh	nting (100	0.00% fix	ed LEL)							334.08	(232)
	saving/ge											
	0.80 x 0.7 0.80 x 0.0										647.715 0.000	
	0.80 x 0.0 0.80 x 0.0										0.000	
	7.00 X 0.0	700 X 0.0	00 X 0.0	50							647.715	(233)
Append	lix Q -											,
-	y saved o	-	ated ():								0.000	(236a)
Energ	y used ()	):									0.000	(237a)
Total de	elivered e	nergy for	all uses								3369.63	(238)

10a. Fuel costs using Table 12 price	10a. Fue	costs	using	Table	12	prices
--------------------------------------	----------	-------	-------	-------	----	--------

The state of the s	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)
SAPvalue			89.68	
			90	(258)
SAP band			В	. ,

#### 12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emission kg CO2/y	
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)
Waterheating	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/yea	ar
CO2 emissions per m <sup>2</sup>			8.56	(273)
El value			92.78	(273a)
El rating			93	(274)
El band			Α	

# Calculation of stars for heating and DHW

Main heating energy efficiency
Main heating environmental impact
Water heating energy efficiency
Water heating environmental impact

 $(3.48 / 0.9020) \times (1 + (0.29 \times 0.00)) = 3.8581$ , stars = 4  $(0.2160 / 0.9020) \times (1 + (0.29 \times 0.00)) = 0.2395$ , stars = 4 3.48 / 0.8816 = 3.9474, stars = 4 0.2160 / 0.8816 = 0.2450, stars = 4

#### Page 8 of 10

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Approval of JPA Designer by BRE applies only to the software, data is not subject to quality control procedures, users are themselves responsible for the accuracy of the data. The results of the calculation should not be accepted without first checking the input data.

### **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

1 TER and DER

Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate

Dwelling Carbon Dioxide Emission Rate

OK

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 **Highest** <u>Average</u> 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 1.10 (max. 2.00) 1.10 (max. 3.30) **Openings** OK

TER = n/a

DER = 9.86

3 Air permeability

Air permeability at 50 pascals: 3.90
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-

Page 9 of 10

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 $\label{lem:condition} C:\label{lem:condition} C:\label{lem:condition} \label{lem:condition} C:\label{lem:condition} \label{lem:condition} C:\label{lem:condition} \label{lem:condition} C:\label{lem:condition} \label{lem:condition} C:\label{lem:condition} \label{lem:condition} \label{lem:condition} \label{lem:condition} \label{lem:condition} \label{lem:condition} C:\label{lem:condition} \label{lem:condition} \label{lem:condition} C:\label{lem:condition} \label{lem:condition} \lab$ 

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

emperature 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):

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/m<sup>2</sup>K

Walls U-value 0.13 W/m<sup>2</sup>K

Design air permeability 3.9 m<sup>3</sup>/h.m<sup>2</sup>

Photovoltaic array

### **Project Information**

Building type Top-floorflat

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	Av. Storey	Volume	
	(m²)	height (m)	(m³)	
Thirdfloor	76.92	2.77	213.07	(3a)
	76.92			(4)
			213.07	(5)

### 2. Ventilation rate

											m³ per ho	our
							main + s	eondar	y + othe	er		
Numbe	er of chim	nevs					heating $0 + 0 + 0$	, ,	k 40		0.00	(6a)
	er of oper	•					0 + 0 + 0		k 40		0.00	(6b)
		mittent fa	ans				3		( 10		30.00	(7a)
		ive vents					0		k 10		0.00	(7b)
	•	ess gas f					0		k 40		0.00	(7c)
											Air chanc	ges per hour
											0.14	(8)
Pressu	re test, r	esult q50	)						3.90			(17)
Air perr	meability										0.34	(18)
											2.00	(19)
											0.85	(20)
		•	_	ter factor							0.29	(21)
Infiltrat	ion rate r	nodified t	for montl	nly wind s	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 F	actor											
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)
Adjuste	ed infiltra	tion rate	(allowing	g for shelt	er and w	ind spee	ed)					
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)
		ural vent inge rate	•	ntermitte	nt extract	t fans						
			1	0.55	0.54	0.54	0.50	0.54	0.55	0.55	0.50	(05)
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 Element	losses a	and hea Gross area, m²	Ope	<b>aramete</b> enings	r Netare A, m²		-value //m²K	A x U W/K		appa-valu J/m²K	e A x K kJ/K	
		-glazed,			12.67		.05 (1.10)			J/111-TX	KO/IX	(27)
Window	r-Double led, low- t (West)		1,		5.47	0 1	.05 (1.10)	5.	76			(27)
Double-	zed door glazed, a En=0.1, s	rgon fille	d,		3.92	0	1.10	4.:	31			(26)
Walls					24.9	6 0	.13 (Ru=0	.85) 3.3	32	70.00	1747.2	0 (29)
HALL\ Walls					42.5	6	0.15	6.3	38	70.00	2979.2	0 (29)
EXTEI Flat roof	RNAL#V fs	VINDOW	S&DOC	ORS	10.7	2	0.13	1.3	39	9.00	96.48	(30)
MAIN I Party wa	all				18.4	2	0.00	0.0	00	180.00	3315.6	0
SOLID Party flo					76.9	2	0.00	0.0	00	40.00	3076.8	0
Party ce	_				66.2	0	0.00	0.0	00	30.00	1986.0	0
ANOT	HER DW	/ELLING	ABOVE									
Fabric h Heat ca Therma Effect of Total fab	ea of extoneat loss pacity I mass patternal oric heat ion heat	, W/K arameter bridges loss	, kJ/m²K		n²						100.3 34.5 13201.2 171.6 13.3 47.8	2 (33) 8 (34) 2 (35) 0 (36)
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 tra	nsfer co	efficient,	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	
Heat los	ss param	eter (HLI	P), W/m²	K							86.4	4 (39)
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 (ave		-			*	*			*	,t	1.1	2 (40)
	of days	·	,	, ·	,	10	1	,				
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
31	28	31	30	31	30	31	31	30	31	30	31	

Jan         Feb         Mar         Apr         May         Jun         Jul         Aug         Sep         Oct         Nov           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           Energy content of hot water used	Dec 105.65
105.65 101.81 97.97 94.12 90.28 86.44 86.44 90.28 94.12 97.97 101.81	
Energy content of hot water used	454.70
	454.70
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) Distribution loss	1511.17
23.50   20.55   21.21   18.49   17.74   15.31   14.19   16.28   16.48   19.20   20.96	22.76
store loss determined from EN 13203-2 tests, taken from boiler data record	
Hot water cylinder loss factor (kWh/day) Volume factor Temperature factor	0.00 0.0000 0.0000 0.0000
Energy lost from store (kWh/day) 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	0.00
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	0.00
Primary loss	
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00
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
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
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
	1821.00
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

_	Intornal	MAINA
:)_	Internal	uanis
•		940

0	nar gann	•									
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabol	lic 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
Lighting											
47.45	42.14	34.27	25.95	19.40	16.37	17.69	23.00	30.87	39.19	45.74	48.77
Applian	ces gains	3	_						_		
317.74	321.03	312.72	295.04	272.71	251.72	237.70	234.41	242.72	260.40	282.73	303.72
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
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
Losses	e.g. evap	oration (ı	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
Water h	eating ga	ains									
78.91	76.69	72.06	65.77	61.68	55.93	51.05	57.31	59.54	66.05	73.40	76.70
Total int	ernal gai	ns									
546.95	542.71	521.91	489.60	456.64	426.88	409.30	417.57	435.97	468.50	504.73	532.03
En=0.1, REAR Full glaz low-E, E REAR	r - Double soft coa ced door - En=0.1, s	t (West) - Double- oft coat	-glazed, (West)					0.63 x 0.8		.77	37.523 <sup>2</sup> 26.890 <sup>2</sup> 151.33
Solar ga	ains										
151.33		487.52	711.01	871.37	892.00	849.23	729.47	567.00	351.26	188.69	124.44
Total ga						0	ne -			20	1
698.27	838.74	1009.42	1200.61	1328.01	1318.88	1258.52	1147.04	4 1002.97	819.76	693.41	656.47
<b>MODUI AN</b>	<b>g calcul</b> a r - Double		argon fil	led low-	Area		g	) ) 80		F x Shac	-
En=0.1, FRON	- Double soft coa	e-glazed, t (East)	J	·	E, 0.9	a x 12.67 x 5.47	С	) ).80 ).80	0	F x Shad .80 x 0.8	6.06

**REAR** 

tau  41.84   41.93   42.02   42.42   42.50   42.86   42.86   42.92   42.72   42.50   42.34   42.86   42.92   42.72   42.50   42.86   42.92   42.72   42.50   42.86   42.92   42.72   42.50   42.86   42.92   42.72   42.50   42.86   42.92   42.72   42.50   42.86   42.92   42.72   42.50   42.86   42.92   42.72   42.50   42.86   42.92   42.72   42.50   42.86   42.92   42.72   42.50   42.86   42.92   42.72   42.50   42.86   42.86   42.92   42.72   42.50   42.86   42.92   42.72   42.50   42.86   4	1.00 ec 2.18 .81 .97
tau  41.84   41.93   42.02   42.42   42.50   42.86   42.86   42.92   42.72   42.50   42.34   42.31   4	2.18
41.84   41.93   42.02   42.42   42.50   42.86   42.86   42.92   42.72   42.50   42.34   42.81	.81
alpha 3.79   3.80   3.80   3.83   3.83   3.86   3.86   3.86   3.85   3.83   3.82   3.84   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   0.84   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   19.75   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   19.98   19.99   19.9	.81
3.79     3.80     3.80     3.83     3.83     3.86     3.86     3.86     3.85     3.83     3.82     3.83       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     0.94       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     19.72       Temperature during heating periods in rest of dwelling Th2       19.97     19.97     19.97     19.98     19.98     19.99	.97
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       0.56         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       19.70         Temperature during heating periods in rest of dwelling Th2         19.97       19.97       19.97       19.98       19.99       19	.97
0.97       0.94       0.87       0.74       0.57       0.41       0.30       0.34       0.56       0.83       0.94       0.9         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       19.97         Temperature during heating periods in rest of dwelling Th2         19.97       19.97       19.97       19.98       19.98       19.99	
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       19.97         Temperature during heating periods in rest of dwelling Th2         19.97       19.97       19.98       19.98       19.99	
19.72     19.99     20.37     20.73     20.92     20.98     21.00     20.99     20.94     20.64     20.10     19.71       Temperature during heating periods in rest of dwelling Th2       19.97     19.97     19.97     19.98     19.98     19.99 <td>9.66</td>	9.66
Temperature during heating periods in rest of dwelling Th2         19.97       19.97       19.98       19.98       19.99       19.99       19.99       19.99       19.99       19.99       19.99       19.98       19.98       19.99 <td< td=""><td>9.66</td></td<>	9.66
19.97   19.97   19.98   19.98   19.99   19.99   19.99   19.99   19.98	<b> </b>
	9.98
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   0.9	.97
Mean internal temperature in the rest of dwelling T2	••
	8.22
Living area fraction (34.67/76.92)	0.45
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	8.87
Apply adjustment to the mean internal temperature, where appropriate	
	8.87
8. Space heating requirement	
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov De	ec
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   0.93   0.94   0.95   0.9	.96
Useful gains	
664.69   768.51   849.30   843.74   708.94   491.53   327.43   342.92   516.02   648.94   639.97   63	30.04
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   4.30	.20
Heat loss rate for mean internal temperature	
	275.11
Fraction of month for heating	
	.00
Space heating requirement for each month, kWh/month	
	79.93
	79.93 2049.15
Space heating requirement per m² (kWh/m²/year)	26.64

### 8c. Space cooling requirement - not applicable

9a. I	=ner	gy r	equi	reme	nts
-------	------	------	------	------	-----

9a. Ene	rgy requ	uiremen	ts								kWh/year	
Fraction	ondary he of space by of mai	e heat fro	om main	system(	s)			9	1.0000 3.20%		-	(202) (206)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Spaceh	eating re	quireme	nt		,,	,				JI.		
459.75	328.07	227.32	93.25	28.63	-	-	-	-	124.83	307.38	479.93	(98)
Appendi	ix Q - mo	nthly en	ergy sav	ed (main	heating	system 1	1)		J			
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space h	eating fu	iel (main	heating	system 1	ĺ)	,	н		А	Л		
493.29	352.00	243.90	100.05	30.72	-	-	-	]-	133.94	329.81	514.95	(211)
Appendi	ix Q - mo	nthly en	ergy save	ed (main	heating	system 2	2)			Л		
0.00	0.00	0.00	0.00	0.00	-	-	-	]-	0.00	0.00	0.00	(212)
Space h	eating fu	el (main	heating	system 2	2)	Л		,	,			
0.00	0.00	0.00	0.00	0.00	-	-	-	]-	0.00	0.00	0.00	(213)
Appendi	ix Q - mo	nthly en	ergy save	ed (seco	ndary he	ating sys	stem)			Л		
0.00	0.00	0.00	0.00	0.00	-	-	-	]-	0.00	0.00	0.00	(214)
Space h	eating fu	el (secor	ndary)							Л		
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Waterhe	eating									Л		
Waterhe	eating re	quiremer	nt									
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)
Efficiend	cy of wate	er 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)
Waterhe	eating fu	el										
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 t				-1	,	JL.			J		kWh/year	(044)
	eating fu eating fu			stem 1							2198.66 0.00	(211) (215)
	eating fu	•	iuai y)								2059.27	(219)
	ty for pur		s and ele	ctric kee	p-hot							(=:=)
central	heating	pump									30.00	(230c)
	with a fan			,							45.00	(230e)
	ectricity for			•							75.00	(231)
	ty for ligh saving/ge	• •		,							335.17	(232)
Appendi		), i o i a ii o i i		<i>.</i> 9.00								
Energy	y saved o		ated ():								0.000	(236a)
Energ	y used ()	:									0.000	(237a)
Total de	livered e	nergy for	all uses								4668.10	(238)

10a	Fuel	costs	เมรากต	Table	12	prices
ıva.	ı ucı	CUSIS	usiiiu	Iabic	12	DIICES

	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			2.42	(252)
			0.42	(256)
CAP at a			1.11	(257)
SAPvalue			84.51	(050)
0404			85	(258)
SAP band			В	

#### 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)
Waterheating	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/yea	ar
CO2 emissions per m <sup>2</sup>			14.72	(273)
Elvalue			87.55	(273a)
El rating			88	(274)
El band			В	

# Calculation of stars for heating and DHW

Main heating energy efficiency
Main heating environmental impact
Water heating energy efficiency
Water heating environmental impact

 $(3.48 / 0.9020) \times (1 + (0.29 \times 0.00)) = 3.8581$ , stars = 4  $(0.2160 / 0.9020) \times (1 + (0.29 \times 0.00)) = 0.2395$ , stars = 4 3.48 / 0.8833 = 3.9395, stars = 4 0.2160 / 0.8833 = 0.2445, stars = 4

#### Page 8 of 10

JPA Designer Version 6.03x , SAP Version 9.92 Licensed to Energy Assessors London Ltd

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Approval of JPA Designer by BRE applies only to the software, data is not subject to quality control procedures, users are themselves responsible for the accuracy of the data. The results of the calculation should not be accepted without first checking the input data.

### **Project Information**

Building type Top-floorflat

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

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

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 **Highest** <u>Average</u> 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 1.10 (max. 2.00) 1.10 (max. 3.30) **Openings** OK

3 Air permeability

Air permeability at 50 pascals: 3.90
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-

Page 9 of 10

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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

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):

Slight OK

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/m<sup>2</sup>K

Walls U-value 0.13 W/m<sup>2</sup>K

Design air permeability 3.9 m<sup>3</sup>/h.m<sup>2</sup>

### **Project Information**

Building type Top-floorflat

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	Av. Storey	Volume	
	(m²)	height (m)	(m³)	
Thirdfloor	76.92	2.77	213.07	(3a)
	76.92			(4)
			213.07	(5)

### 2. Ventilation rate

											m³ per ho	our
							main + s	eondar	y + othe	er		
Numbe	er of chim	nevs					heating $0 + 0 + 0$	) ,	k 40		0.00	(6a)
	er of oper	•					0 + 0 + 0		k 40		0.00	(6b)
	er of inter		ans				3		( 10		30.00	(7a)
	er of pass						0		k 10		0.00	(7b)
	er of fluel						0		k 40		0.00	(7c)
											Air chanc	ges per hour
											0.14	(8)
Pressu	ıre test, r	esult q50	)						3.90			(17)
Air peri	meability	,									0.34	(18)
											2.00	(19)
											0.85	(20)
		•	_	ter factor							0.29	(21)
Infiltrat	ion rate r	nodified f	for month	nly wind s	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	
\4 <i>!</i>     =	- ,										52.50	(22)
Wind F												
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)
Adjuste	ed infiltra	tion rate	(allowing	g for shelt	er and w	ind spee	ed)					
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)
	ition : nat ve air cha			ntermitte	nt extract	t fans						
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)
0.57	0.50	0.50	0.55	0.55	10.04	0.54	0.55	0.04	0.00	0.55	0.50	(20)

3. Heat	losses a	and hea	t loss pa	aramete	r							
Element	t	Gross	Ope	enings	Netare	a U-	value	$A \times U$		appa-valu		
		area, m2	<sup>2</sup> m <sup>2</sup>		A, m²	W	/m²K	W/K	k	J/m²K	kJ/K	
Window	r-Double	-glazed,			5.47	0 1.	05 (1.10)	5.7	76			(27)
argon fil	lled, low-	E, En=0.	1,									
soft coa	t (West)											
REAR												
Window	- Double	-glazed,			12.67	0 1.	05 (1.10)	13.3	35			(27)
	lled, low-											
soft coa	it (East)											
FRON	T É											
Full glaz	zed door	-			3.92	0	1.10	4.3	31			(26)
-	glazed, a		d.									,
	En=0.1, s	-	- /									
(West)	, .											
REAR												
Walls					24.9	6 0	13 (Ru=0	.85) 3.3	32	70.00	1747.2	20 (29)
HALL	ΜΔΥ				27.0	0.	15 (11a=0	.00) 0.0	)_	70.00	1171.2	(23)
Walls	V V A I				42.5	8	0.15	6.3	00	70.00	2979.2	00 (20)
	RNAL#V	VINDOV	16 8 DOC	)DC	42.5	U	0.15	0.0	00	70.00	2919.2	20 (29)
		VIINDOV	Sabot	JKS	10.7	2	0.42	4 .	20	0.00	96.48	(20)
Flat roof	_				10.7	2	0.13	1.3	99	9.00	90.40	(30)
MAINI					40.4	^	0.00	0.0	20	400.00	2245.0	20
Party wa					18.4	2	0.00	0.0	)0	180.00	3315.6	5 <b>U</b>
SOLID					70.0	_	0.00	0.0	20	40.00	0070	
Party flo		,	551.014		76.9	2	0.00	0.0	)0	40.00	3076.8	30
	HER DW	/ELLING	BELOW	'		_					4000	
Party ce	_				66.2	Ü	0.00	0.0	)0	30.00	1986.0	00
ANOT	HER DW	/ELLING	ABOVE									
	ea of exte		ments S	igma A, ı	m²						100.3	` ,
Fabric h	neat loss	, W/K									34.5	` ,
Heat ca											13201.2	28 (34)
Therma	l mass pa	arameter	, kJ/m²K								171.6	62 (35)
Effect of	f thermal	bridges									13.3	30 (36)
Total fal	bric heat	loss									47.8	32 (37)
Ventilati	ion heat l	loss calc	ulated m	onthly								
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)
	insfer coe				]			1				,
87.64	87.45	87.28	86.45	86.29	85.56	85.56	85.43	85.84	86.29	86.60	86.93	
07.04	07.43	67.26	60.45	00.29	00.00	65.56	00.43	05.04	00.29	80.00		(00)
11		. ( /  1	D) \\/\/2	1.7							86.4	14 (39)
	ss param				1	1		·	1	10	·	
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 (ave	0 /										1.1	12 (40)
Number	r of days i	in month	(Table 1	a)								
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
31	28	31	30	31	30	31	31	30	31	30	31	
<u> </u>				<u> </u>		J .		100			J .	

tot water usage in litres per day for each month	Assume	e <b>r heatin</b> ed occupa average l	ancy, N	•		er day Vd	l,average	e				<b>kWh/year</b> 2.40 96.05	(42 (43
105.65   101.81   97.97   94.12   90.28   86.44   86.44   90.28   94.12   97.97   101.81   105.65     101.81   97.97   94.12   90.28   86.44   86.44   90.28   94.12   97.97   101.81   105.65     101.81   97.97   94.12   90.28   86.44   86.44   90.28   94.12   97.97   101.81   105.65     101.81   97.97   94.12   102.07   94.59   108.54   109.84   128.00   139.73   151.73     101.17   10	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
nergy 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     1511.17     1511.1	Hot wate	er usage	in litres	oer day f	or each r	nonth							
156.68   137.03   141.40   123.28   118.29   102.07   94.59   108.54   109.84   128.00   139.73   151.73     1511.17   1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17   1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17   1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17     1511.17	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
1511.17   1511	Energy	content c	of hot wat	ter used									
Assignation loss instribution loss in the property of the property	156.68	137.03	141.40	123.28	118.29	102.07	94.59	108.54	109.84	128.00	139.73	151.73	
store loss determined from EN 13203-2 tests, taken from boiler data record    0.00			annual)									1511.17	(4
Octowater cylinder loss factor (kWh/day)   0.0000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.	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
tot water cylinder loss factor (kWh/day) 0.0000 colume factor 0.0000 emperature factor 0.000 emperature factor emperature factor 0.000 emperature factor emperature factor 0.000 emperature factor emperature factor 0.000 emperature factor emperature	store I	oss dete	rmined fr	om EN 1	3203-21	tests, tak	en from	boiler da	ita record	t	<u></u>		
emperature factor store (kWh/day) 0.000 nergy lost from store (kWh/day) 0.000 notal storage loss 0.000 0.00 0.00 0.00 0.00 0.00 0.00		-	er loss fa	ctor (kW	h/day)							0.0000	<b>(5</b> )
0.00 otal storage loss 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.			or										(5) (5)
otal 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   0.00     tet storage loss   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     trimary loss   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     1.000   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     1.000   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     1.000   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     1.000   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     1.000   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     1.000   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     1.000   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     1.000   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     1.000   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     1.000   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     1.000   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     1.000   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     1.000   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     1.000   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00     1.000   0.0	•			Wh/dav)									(5
let storage loss   0.00	٠.		,	, ,									(-
0.00   0.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
rimary 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   0.00   0.00    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    otal 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    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    1821.00    leat gains from water heating, kWh/month	Net stor	age loss	у	,		,		,		Л			
0.00   0.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
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    26.47   23.89   26.39   25.45   26.24   25.33   26.13   26.20   25.40   26.33   25.56   26.45    26.48   26.49   26.39   26.39   25.56   26.45    26.49   26.40   26.33   25.56   26.45    26.49   26.30   26.30   25.40   26.33   25.56   26.45    26.49   26.30   26.30   25.40   26.33   25.56   26.45    26.49   26.30   26.30   25.40   26.33   25.56   26.45    26.49   26.30   26.30   25.40   26.33   25.56   26.45    26.49   26.30   26.30   25.40   26.30   25.40   26.33   25.56   26.45    26.40   26.30   26.30   25.40   26.30   25.40   26.30   25.40    26.41   26.20   26.30   25.40   26.30   25.40   26.30   25.40    26.45   26.45   26.45   26.45    26.45   26.45   26.45   26.45    26.46   26.30   26.30   25.40   26.30   25.40    26.47   26.20   26.30   25.40   26.30   25.40    26.47   26.20   26.30   25.40   26.30   25.40    26.47   26.20   26.30   25.40   26.30   25.40    26.49   26.30   25.40   26.30   25.40    26.49   26.30   25.40   26.30   25.40    26.40   26.30   25.40   26.30   25.40    26.40   26.30   25.40   26.30   25.40    26.40   26.30   25.40   26.30   25.40    26.40   26.30   25.40   26.30   25.40    26.40   26.30   26.30   25.40    26.40   26.30   25.40   26.30   25.40    26.40   26.30   25.40   26.30   25.40    26.40   26.30   25.40   26.30   25.40    26.40   26.30   26.30   25.40    26.40   26.30   26.30   25.40    26.40   26.30   26.30   25.40    26.40   26.30   26.40   26.30   25.40    26.40   26.30   26.30   25.40    26.40   26.30   26.40   26.30   25.40    26.40   26.30   26.40   26.30   26.40    26.40   26.30   26.40   26.30   26.40    26.40   26.30   26.40   26.30   26.40    26.40   26.30   26.40   26.30   26.40    26.40   26.40   26.30   26.40   26.40    26.40   26.40   26.40   26.40   26.40    26.40   26.40   26.40   26.40   26.40    26.40   26.40   26.40   26.40   26.40    26.40   26.40   26.40   26.40   26.40    26.40   26.40   26.40   26.40   26.40    26.40	Primary	loss											
26.47   23.89   26.39   25.45   26.24   25.33   26.13   26.20   25.40   26.33   25.56   26.45    total heat required for water heating calculated for each month    83.14   160.92   167.79   148.73   144.53   127.40   120.72   134.74   135.23   154.33   165.29   178.18    Output from water heater for each month, kWh/month    83.14   160.92   167.79   148.73   144.53   127.40   120.72   134.74   135.23   154.33   165.29   178.18      83.14   160.92   167.79   148.73   144.53   127.40   120.72   134.74   135.23   154.33   165.29   178.18      1821.00      1821.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(5
otal heat required for water heating calculated for each month    83.14   160.92   167.79   148.73   144.53   127.40   120.72   134.74   135.23   154.33   165.29   178.18      output from water heater for each month, kWh/month    83.14   160.92   167.79   148.73   144.53   127.40   120.72   134.74   135.23   154.33   165.29   178.18      1821.00   leat gains from water heating, kWh/month	Combi l	oss calcu	lated for	each mo	onth					Л			
183.14   160.92   167.79   148.73   144.53   127.40   120.72   134.74   135.23   154.33   165.29   178.18   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    1821.00	26.47	23.89	26.39	25.45	26.24	25.33	26.13	26.20	25.40	26.33	25.56	26.45	(6
Output from water heater for each month, kWh/month    83.14   160.92   167.79   148.73   144.53   127.40   120.72   134.74   135.23   154.33   165.29   178.18      1821.00   leat gains from water heating, kWh/month	Total he	at requir	ed for wa	ter heati	ng calcul	ated for	each mo	nth	,				
183.14   160.92   167.79   148.73   144.53   127.40   120.72   134.74   135.23   154.33   165.29   178.18   1821.00   leat gains from water heating, 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	(6
1821.00 leat gains from water heating, kWh/month	Output f	rom wate	er heater	for each	month, l	«Wh/mor	nth			*			
leat gains from water heating, 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	(6
			*		8		,			*		1821.00	(6
58.71   51.53   53.61   47.35   45.89   40.27   37.98   42.64   42.87   49.14   52.85   57.06	Heat ga	ins from	water he	ating, kW	/h/month	1							
	58.71	51.53	53.61	47.35	45.89	40.27	37.98	42.64	42.87	49.14	52.85	57.06	(6

 Internal	I CIAILIS

Jan											
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metaboli	ic 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
Lighting											
47.45	42.14	34.27	25.95	19.40	16.37	17.69	23.00	30.87	39.19	45.74	48.77
Applianc	es gains	3	_				_				
317.74	321.03	312.72	295.04	272.71	251.72	237.70	234.41	242.72	260.40	282.73	303.72
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
Pumps a	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
Losses e	.g. evap	oration (r	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
Water he	eating ga	ains									
78.91	76.69	72.06	65.77	61.68	55.93	51.05	57.31	59.54	66.05	73.40	76.70
Total inte	ernal gai	ns									
546.95	542.71	521.91	489.60	456.64	426.88	409.30	417.57	435.97	468.50	504.73	532.03
En=0.1,		e-glazed, t (West)	argon fill	led, low-l		a & Flux x 5.470 ′	_	) & FF ).63 x 0.8		hading .77	Gains 37.5231
En=0.1, REAR Window En=0.1, FRONT Full glaze low-E, E REAR	soft coa - Double soft coa r ed door n=0.1, s	t (West) e-glazed, t (East)	argon fill -glazed, a (West)	led, low-l	Area E, 0.9	x 5.470 <sup>^</sup> x 12.670	19.64 Č	).63 x 0.8	30 O	•	
En=0.1, REAR Window En=0.1, FRONT Full glaze low-E, E REAR Total sol	soft coa - Double soft coa r ed door n=0.1, s ar gains ins	e-glazed, t (East) - Double- oft coat , January	argon fill -glazed, a (West)	led, low-l	Area E, 0.9	x 5.470 <sup>2</sup> x 12.670 x 3.920 <sup>2</sup>	19.64 C	0.63 x 0.8 0.63 x 0.8 0.63 x 0.8	60 0 60 0	.77 .77 .77	37.5231 86.9136 26.8904 151.33
En=0.1, REAR Window En=0.1, FRONT Full glaze low-E, E REAR Total sol Solar gai	soft coa - Double soft coa - ed door n=0.1, s ar gains ins	e-glazed, t (East) - Double- oft coat	argon fill -glazed, a (West)	led, low-l	Area E, 0.9	x 5.470 <sup>2</sup> x 12.670 x 3.920 <sup>2</sup>	19.64 C	0.63 x 0.8 0.63 x 0.8 0.63 x 0.8	30 O	.77 .77 .77	37.5231 86.9136 26.8904 151.33
En=0.1, REAR Window En=0.1, FRONT Full glaz low-E, E REAR Total sol Solar gai 151.33	soft coar - Double soft coar ed door- n=0.1, s ar gains ins 296.03	e-glazed, t (East) - Double- oft coat , January	argon fill -glazed, a (West) /	led, low-largon fillo	Area E, 0.9 and E, 0.9	x 5.470 ° x 12.670 x 3.920 ° 849.23	19.64 C	0.63 x 0.8 0.63 x 0.8 0.63 x 0.8	351.26	.77 .77 .77	37.5231 86.9136 26.8904 151.33
En=0.1, REAR Window En=0.1, FRONT Full glaze low-E, E REAR Total sol Solar gai	soft coa - Double soft coa - ed door n=0.1, s ar gains ins	e-glazed, t (East) - Double- oft coat , January	argon fill -glazed, a (West)	led, low-largon fillo	Area E, 0.9 and E, 0.9	x 5.470 ° x 12.670 x 3.920 ° 849.23	19.64 C	0.63 x 0.8 0.63 x 0.8 0.63 x 0.8	351.26	.77 .77 .77	37.5231 86.9136 26.8904 151.33
En=0.1, REAR Window En=0.1, FRONT Full glaze low-E, E REAR Total sol Solar gai 151.33 Total gai 698.27  Lighting	soft coarsoft coarsof	e-glazed, t (East) - Double-oft coat , January 487.52	argon fill -glazed, a (West) /	871.37	Area E, 0.9 E, 0.9 ed, 0.9 1318.88	x 5.470 ° x 12.670 x 3.920 ° 849.23	19.64 C	0.63 x 0.8 0.63 x 0.8 0.63 x 0.8 567.00	351.26 819.76	.77 .77 .77	37.5231 86.9136 26.8904 151.33 124.44 656.47

**FRONT** 

alpha 3.79	2.18
tau  41.84   41.93   42.02   42.42   42.50   42.86   42.86   42.92   42.72   42.50   42.34   42.81   4	2.18 81 97
41.84   41.93   42.02   42.42   42.50   42.86   42.86   42.92   42.72   42.50   42.34   42.81	97
alpha  3.79   3.80   3.80   3.83   3.83   3.86   3.86   3.86   3.85   3.83   3.82   3.8  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   0.8  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   19.9  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   19.98   19.99	97
3.79   3.80   3.80   3.83   3.83   3.86   3.86   3.86   3.85   3.83   3.82   3.80   3.81   3.82   3.82   3.83   3.82   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.82   3.83   3.82   3.83   3.82   3.83   3.82   3.82   3.83   3.82   3.83   3.82   3.	97
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       0.94         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       19.97         Temperature during heating periods in rest of dwelling Th2         19.97       19.97       19.97       19.98       19.99       19	97
0.97       0.94       0.87       0.74       0.57       0.41       0.30       0.34       0.56       0.83       0.94       0.9         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       19.97         Temperature during heating periods in rest of dwelling Th2         19.97       19.97       19.97       19.98       19.98       19.99	
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       19.97         Temperature during heating periods in rest of dwelling Th2         19.97       19.97       19.97       19.98       19.99	
19.72   19.99   20.37   20.73   20.92   20.98   21.00   20.99   20.94   20.64   20.10   19.00	9.66
Temperature during heating periods in rest of dwelling Th2         19.97       19.97       19.98       19.98       19.99       19.99       19.99       19.99       19.99       19.99       19.99       19.98       19.98       19.98       19.99 <td< td=""><td>9.66</td></td<>	9.66
19.97   19.97   19.98   19.98   19.99   19.99   19.99   19.99   19.98   19.98   19.98   19.98	
	9.98
Ourisation 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 0.9	97
Mean internal temperature in the rest of dwelling T2	
	3.22
Living area fraction (34.67/76.92)	0.45
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	3.87
Apply adjustment to the mean internal temperature, where appropriate	
	3.87
8. Space heating requirement	
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov De	ec
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   0.9	96
Useful gains	
664.69   768.51   849.30   843.74   708.94   491.53   327.43   342.92   516.02   648.94   639.97   63	30.04
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   4.30	20
Heat loss rate for mean internal temperature	
	275.11
Fraction of month for heating	• • • •
	00
Space heating requirement for each month, kWh/month	
	79.93
	2049.15
Space heating requirement per m <sup>2</sup> (kWh/m <sup>2</sup> /year)	26.64

### 8c. Space cooling requirement - not applicable

9a. Energy requirements		
No secondary heating system selected	kWh/year	
Fraction of space heat from main system(s) 1.0000		(202)
Efficiency of main heating system 93.20%		(206)
JanFebMarAprMayJunJulAugSepOctNov	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	(212)
Space heating fuel (main heating system 2)		
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	(214)
Space heating fuel (secondary)		` ,
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)
Appropriately		
Annual totals Space heating fuel used, main system 1	kWh/year 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 boiler with a fan-assisted flue	30.00	(230c)
Total electricity for the above, kWh/year	45.00 75.00	(230e) (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 -	003.020	(233)
Energy saved or generated ():	0.000	(236a)
Energy used ():	0.000	(237a)
Total delivered energy for all uses	3804.48	(238)

10a	Fuel	costs	เมรากต	Table	12	prices
ıva.	ı ucı	CUSIS	usiiiu	Iabic	12	DIICES

, , , , , , , , , , , , , , , ,	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)
SAPvalue			89.99	
			90	(258)
SAP band			В	

#### 12a. Carbon dioxide emissions

	Energy kWh/year	Emission factor kg CO2/kWh	Emission kg CO2/ye	
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)
Waterheating	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/yea	ar
CO2 emissions per m <sup>2</sup>			8.90	(273)
El value			92.48	(273a)
El rating			92	(274)
El band			Α	

# Calculation of stars for heating and DHW

Main heating energy efficiency Main heating environmental impact Water heating energy efficiency Water heating environmental impact

 $(3.48 / 0.9020) \times (1 + (0.29 \times 0.00)) = 3.8581$ , stars = 4  $(0.2160 / 0.9020) \times (1 + (0.29 \times 0.00)) = 0.2395$ , stars = 4 3.48 / 0.8833 = 3.9395, stars = 4 0.2160 / 0.8833 = 0.2445, stars = 4

#### Page 8 of 10

Building type Top-floorflat

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

1 TER and DER

Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate TER = n/aDwelling Carbon Dioxide Emission Rate DER = 10.33

OK

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

2b Fabric U-values

Element **Highest** <u>Average</u> 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 1.10 (max. 2.00) 1.10 (max. 3.30) **Openings** OK

3 Air permeability

Air permeability at 50 pascals: 3.90
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-

Page 9 of 10

JPA Designer Version 6.03x , SAP Version 9.92 Licensed to Energy Assessors London Ltd

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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

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

OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):

Slight

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/m<sup>2</sup>K

Walls U-value 0.13 W/m<sup>2</sup>K

Design air permeability 3.9 m<sup>3</sup>/h.m<sup>2</sup>

Photovoltaic array

Building type Top-floorflat

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	Av. Storey	Volume	
	(m²)	height (m)	(m³)	
Fourth and other floors	69.17	2.52	174.31	(3a)
	69.17			(4)
			174.31	(5)

### 2. Ventilation rate

											m³ per	ho	ur
							main + s	eondar	y + othe	r			
NI							heating		. 10		0.0	^	(0-)
	er of chim	•					0 + 0 + 0		< 40		0.0	-	(6a)
	er of open						0 + 0 + 0		¢ 20		0.0	-	(6b)
	er of interi						3		<b>&lt;</b> 10		30.0		(7a)
	er of pass						0	)	<b>‹</b> 10		0.0	0	(7b)
Numbe	er of fluele	ess gas fi	res				0	)	< 40		0.0	0	(7c)
											Air cha	ang	es per hour
											0.1	7	(8)
Pressu	re test, re	esult q50	)						3.90				(17)
Air perr	neability	·									0.3	7	(18)
•	•										2.0	0	(19)
											0.8		(20)
Infiltrat	ion rate ir	corpora	tina shelt	erfactor							0.3		(21)
	ion rate n				peed						0.0	-	()
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		
Wind F											52.5	0	(22)
			1	_	,	nr.		,					
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18		
							,	•			13.1	3	(22a)
Adjuste	ed infiltra	tion rate	(allowing	for shelt	er and wi	nd spee	d)						,
0.40	0.39	0.38	0.34	0.34	0.30	0.30	0.29	0.31	0.34	0.35	0.37		
											4.1	n	(22b)
Ventila	tion : nat	ural vent	ilation in	termitter	nt extract	fans					-7.1	9	(220)
	≀e air cha		nauon, m	CHILLE	ii Oxiiadi	iulis							
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)
3.00		3.07	0.00	3.00	J 5.5 i	J.O.		3.00	3.00	3.00	3.07		()

3. Heat Element		and hear Gross area, m²	Оре	n <b>ramete</b> enings	r Netarea A, m²		J-value V/m²K	A x U W/K		kappa-value kJ/m²K	e A x K kJ/K	
	led, low-	e-glazed, E, En=0.			3.48		.05 (1.10)		67	NO/III IX	NO/TY	(27)
Window argon fill soft coat FRON	led, low- t (East)	-glazed, E, En=0.	1,		10.84	0 1	.05 (1.10)	11.	42			(27)
Full glaz	ed door glazed, a	rgon fille	d,		7.75	2	1.10	8.	53			(26)
Walls HALLV	<b>Λ/Δ</b> Υ				15.40	0 0	).13(Ru=0	.85) 2.	05	70.00	1078.0	0 (29)
Walls		VINDOW	'S & DOC	ND Q	63.5	1	0.15	9.	53	70.00	4445.5	5 (29)
Flat roof	S	VIINDOVV	Jaboc	, ito	69.17	7	0.13	8.	99	9.00	622.53	(30)
Party flo	or	/ELLING	BELOW		69.17	7	0.00	0.	00	40.00	2766.8	0
Total are	ea of ext	ernal ele	ments Si	gma A, ı	m²						170.1	5 (31)
Fabric h											44.1	
Heat cap											8912.8	` ,
		arameter	, kJ/m²K								128.8	` ,
Effect of		•									13.3	` ,
Total fab		ioss loss calc	ulated m	onthly							57.4	8 (37)
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)
		efficient,		32.00	31.29	31.29	31.10	31.30	32.00	32.31	32.03	(30)
	nr.	,	nic	00.40	00.77	00.77	00.04	00.04	00.40	00.70	00.44	
90.80	90.62	90.45	89.63	89.48	88.77	88.77	88.64	89.04	89.48	89.79	90.11	(00)
		eter (HLI	,,			1		,			89.6	3 (39)
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 (ave											1.3	0 (40)
		in month	,	,	Υ	1		,		nr.		
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
31	28	31	30	31	30	31	31	30	31	30	31	

Assume	er heatin ed occup	ancy, N	•								kWh/year 2.23	(4
Jan	average     Feb	not watei Mar	Apr	May	Jun	ı,average Jul	Aug	Sep	Oct	Nov	91.65 Dec	(•
	er usage	J			J	<b></b>	<u> </u>	<u>  Cop</u>		1.101		
100.81	,	93.48	89.81	86.15	82.48	82.48	86.15	89.81	93.48	97.14	100.81	(
	content of				1			10000				`
149.50	130.75	134.92	117.63	112.87	97.40	90.25	103.57	104.80	122.14	133.32	144.78	
	content (a	annual)	JL		JL	J	JL		JL	J	1441.94	(-
22.42	19.61	20.24	17.64	16.93	14.61	13.54	15.53	15.72	18.32	20.00	21.72	(4
store l	oss dete	rmined fr	om EN 1	3203-21	tests, tak	en from	boiler da	ta record	Ė			
Volume			ctor (kW	h/day)							0.00 0.0000 0.0000	<b>(</b> ;
	ature fact lost from		//h/dav\								0.0000 0.00	(
0,	orage los	,	/vii/day)								0.00	(
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(
Net stor	age loss	J	JL			JI.				JI.		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(
Primary	loss	, I	,		,	Л	А			Л		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(!
Combi l	oss calcu	lated for	each mo	onth					•			
26.43	23.84	26.33	25.41	26.20	25.29	26.10	26.16	25.35	26.28	25.51	26.41	(
Total he	at requir	ed for wa	ter heati	ng calcul	ated for	each mo	nth		,			
175.93	154.59	161.25	143.04	139.07	122.69	116.35	129.73	130.16	148.41	158.84	171.19	(
Output f	rom wate	er heater	for each	month, k	«Wh/mor	nth			J			
175.93	154.59	161.25	143.04	139.07	122.69	116.35	129.73	130.16	148.41	158.84	171.19	(
				n /							1751.26	(
	ins from		·	1	,			T		T		,
56.32	49.44	51.44	45.46	44.08	38.71	36.53	40.98	41.19	47.18	50.71	54.74	(

 Internal	I CIAILIS

J. IIII <del>U</del> II	ııaı yaırı	3									
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabol	lic 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
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
Applian	ces gains	6									
291.57	294.60	286.97	270.74	250.25	230.99	218.13	215.10	222.73	238.96	259.45	278.71
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
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
Losses	e.g. evap	oration (r	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
Water h	eating ga	ains	-								-
75.69	73.56	69.15	63.14	59.25	53.76	49.10	55.08	57.20	63.41	70.43	73.58
Total int	ernal gai	ns									
508.90	504.93	485.66	455.79	425.39	397.88	381.57	389.38	406.35	436.44	469.95	495.13
En=0.1, FRON Full glaz ow-E, E REAR	r - Double , soft coa T zed door · En=0.1, s	t (East) - Double- oft coat	glazed, a					).63 x 0.8		.77 .77	74.3615 53.1771 151.41
Solar ga	ains										
151.41	296.19	487.79	711.41	871.85	892.50	849.69	729.88	567.31	351.46	188.79	124.51
Total ga	ins		JU	A.	*	JU	н	^			
660.31	801.12	973.45	1167.20	1297.25	1290.38	1231.26	1119.26	973.67	787.89	658.74	619.64
Lightin	g calcul	ations			Area	3	g	1	F	F x Shac	dina
En=0.1, REAR		t (West)	-		E, 0.9	x 3.48		).80		.80 x 0.8	-
Window En=0.1,	/ - Double	-glazed,	argon fil	led low-l	F ng	x 10.84	0	08.0	0	8.0 x 0.8	3 5.18

**FRONT** 

	n interna				,	<b>T</b> I 4 (0	.0\				04.00
	rature du g system i			as in the	living are	ea, In1 (°	(C)				21.00 1.00
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
au	1.00	IVIGI	7 (5)	Iviay	Joan	Joan		ТООР		1101	1000
27.27	27.32	27.37	27.62	27.67	27.89	27.89	27.93	27.80	27.67	27.57	27.48
	21.32	21.31	27.02	27.07	27.09	27.09	21.93	27.00	27.07	21.31	27.40
alpha	0.00	0.00	0.04	0.04	0.00	0.00	0.00	0.05	0.04	0.04	0.00
2.82	2.82	2.82	2.84	2.84	2.86	2.86	2.86	2.85	2.84	2.84	2.83
	on factor		,	1	1		1	1	1		
0.94	0.91	0.84	0.71	0.56	0.42	0.31	0.35	0.56	0.80	0.92	0.95
	nternal te		,	_		1	1	Υ	1		
19.12	19.46	19.95	20.46	20.78	20.93	20.98	20.97	20.84	20.36	19.64	19.05
	rature du		,			,		V	2	10	
19.83	19.83	19.83	19.84	19.85	19.85	19.85	19.86	19.85	19.85	19.84	19.84
Utilisati	on factor	for gains	for rest	of dwellir							
0.93	0.89	0.81	0.67	0.51	0.35	0.23	0.27	0.48	0.76	0.90	0.94
Mean ir	nternal te	mperatui	re in the r	est of dw	elling T2	2					
17.39	17.87	18.55	19.24	19.63	19.80	19.84	19.84	19.72	19.13	18.14	17.29
_	irea fracti iternal tei	`	,		welling)						0.42
18.12	18.54	19.14	19.75	20.11	20.28	20.32	20.31	20.19	19.65	18.77	18.03
	djustmer	J			J				10100		
18.12	18.54	19.14	19.75	20.11	20.28	20.32	20.31	20.19	19.65	18.77	18.03
		1						1=00	10.00		10.00
8. Spac	ce heatir	ıg requii	rement								
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisati	on factor	for gains	5		,				Л		
0.92	0.87	0.79	0.67	0.52	0.37	0.26	0.30	0.51	0.75	0.88	0.93
Useful	gains	,		,		JI.	ı		,		
604.21	698.61	773.62	780.95	676.18	482.45	324.51	338.33	491.85	590.84	579.94	573.40
Monthly	_ /average	external		ture	JL		JL		JI		
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20
	ss rate fo						10110	1	10.00		
	2 1235.74				503.89	330.15	346.79	542.40	809.69	1047 66	1246.37
	n of mont			7.02.00	000.00	300.10	0.0.70	10 12.40	_ 555.55	10 17 .00	1 12 10.07
1.00	1.00	1.00	1.00	1.00	1_		-	-	1.00	1.00	1.00
	neating re				-   k\\/h/~	onth.	J	J	1.00	1.00	1.00
					i, KVVII/II	1011111		1	160.00	226.76	E00.00
483.83		275.08			(14) (15)	- (0 -4 -	-  -	-	162.82	336.76	500.69
	pace hear neating re	•		•	` •	ar) (Octo	per to Ma	ay)			2315.26 33.47
space i	reating re	quireme	in perm	- (KVVII/M	ryear)						33.47

## 8c. Space cooling requirement - not applicable

9a. Energy requirements	
	kWh/year
No secondary heating system selected	

		_	_								kWh/year	
Fraction	ndary he of space by of mail	heat fro	m main	system(	s)			9:	1.0000 3.20%			(202) (206)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Spaceh	eating re	quiremer	nt		JI	JI			JL	JL		
483.83	360.95	275.08	138.09	57.04	-	-	-	-	162.82	336.76	500.69	(98)
Appendi	x Q - mo	nthly ene	ergy save	ed (main	heating	system 1	1)		JI.	JI.		
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space h	eating fu	el (main	heating	system 1	i)	J			J	JI.		
519.13	387.29	295.15	148.16	61.20	-	-	-	<b> </b> -	174.70	361.33	537.22	(211)
Appendi	ix Q - mo	nthly ene	ergy save	ed (main	heating	system 2	2)		J	JI.		
0.00	0.00	0.00	0.00	0.00	-	-	-	<b> </b> -	0.00	0.00	0.00	(212)
Space h	eating fu	el (main	heating	system 2	2)	,			,	,		
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(213)
Appendi	ix Q - mo	nthly ene	ergy save	ed (seco	ndary he	ating sys	stem)		,	А		
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(214)
Space h	eating fu	el (secon	dary)		,	Л	.,		,	Л		
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(215)
Water he					,	Л			J	, and a second		
Waterhe	eating red	quiremen	nt									
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)
Efficiend	cy of wate	er 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 he	eating fue	el										
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)
	eating fu			stem 1							kWh/year 2484.19	(211)
Water he	eating fu eating fue ty for pur	el <sup>`</sup>	• •	ectric kee	ep-hot						0.00 1977.93	(215) (219)
	heating	•									30.00	(230c)
	vith a fan										45.00	(230e)
	ectricity for			-							75.00	(231)
Energy s Appendi		eneration	technolo	,							307.57	(232)
	y saved c		ited ():								0.000	(236a)
Energ	y used ()	:									0.000	(237a)
Total de	livered e	nergy for	all uses								4844.69	(238)

10a	Fuel	costs	เมรากต	Table	12	prices
ıva.	ı ucı	CUSIS	usiiiu	Iabic	12	DIICES

, , , , , , , , , , , , , , , ,	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)
0.45			1.20	(257)
SAPvalue			83.28	(050)
			83	(258)
SAP band			В	

#### 12a. Carbon dioxide emissions

	Energy	Emission factor	Emission	
	kWh/year	kg CO2/kWh	kg CO2/y	ear
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)
Waterheating	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/yea	ır
CO2 emissions per m <sup>2</sup>			16.80	(273)
Elvalue			86.36	(273a)
El rating			86	(274)
El band			В	

# Calculation of stars for heating and DHW

Main heating energy efficiency
Main heating environmental impact
Water heating energy efficiency
Water heating environmental impact

 $(3.48 / 0.9020) \times (1 + (0.29 \times 0.00)) = 3.8581$ , stars = 4  $(0.2160 / 0.9020) \times (1 + (0.29 \times 0.00)) = 0.2395$ , stars = 4 3.48 / 0.8844 = 3.9347, stars = 4 0.2160 / 0.8844 = 0.2442, stars = 4

#### Page 8 of 10

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Approval of JPA Designer by BRE applies only to the software, data is not subject to quality control procedures, users are themselves responsible for the accuracy of the data. The results of the calculation should not be accepted without first checking the input data.

Building type Top-floorflat

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

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

= 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

2b Fabric U-values

Element **Highest** <u>Average</u> 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 1.10 (max. 2.00) 1.10 (max. 3.30) **Openings** OK

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-

Page 9 of 10

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5 Cylinder insulation

Hot water storage No cylinder

6 Controls

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

Time and temperature zone control Space heating controls

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 OK

Medium

Based on:

Thermal mass parameter: 128.85

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

Orientation: East

Ventilation rate:

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/m<sup>2</sup>K

Walls U-value 0.13 W/m2K

Design air permeability 3.9 m<sup>3</sup>/h.m<sup>2</sup>

Building type Top-floorflat

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	Av. Storey	Volume	
	(m²)	height (m)	(m³)	
Fourth and other floors	69.17	2.52	174.31	(3a)
	69.17			(4)
			174.31	(5)

### 2. Ventilation rate

											m³ per	ho	ur
							main + s	eondar	y + othe	r			
NI							heating		. 10		0.0	^	(0-)
	er of chim	•					0 + 0 + 0		< 40		0.0	-	(6a)
	er of open						0 + 0 + 0		¢ 20		0.0	-	(6b)
	er of interi						3		<b>&lt;</b> 10		30.0		(7a)
	er of pass						0	)	<b>‹</b> 10		0.0	0	(7b)
Numbe	er of fluele	ess gas fi	res				0	)	< 40		0.0	0	(7c)
											Air cha	ang	es per hour
											0.1	7	(8)
Pressu	re test, re	esult q50	)						3.90				(17)
Air perr	neability	·									0.3	7	(18)
•	•										2.0	0	(19)
											0.8		(20)
Infiltrat	ion rate ir	corpora	tina shelt	erfactor							0.3		(21)
	ion rate n				peed						0.0	-	()
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		
Wind F											52.5	0	(22)
			1		,	nr.		,					
1.27	1.25	1.23	1.10	1.07	0.95	0.95	0.93	1.00	1.07	1.13	1.18		
							,	•			13.1	3	(22a)
Adjuste	ed infiltra	tion rate	(allowing	for shelt	er and wi	nd spee	d)						,
0.40	0.39	0.38	0.34	0.34	0.30	0.30	0.29	0.31	0.34	0.35	0.37		
											4.1	n	(22b)
Ventila	tion : nat	ural vent	ilation in	termitter	nt extract	fans					-7.1	9	(220)
	≀e air cha		nauon, m	CHILLE	ii Oxiiadi	iulis							
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)
3.00		3.07	0.00	3.00	J 5.5 i	J.O.		3.00	3.00	3.00	3.07		()

3. Heat Element		and hear Gross area, m²	Оре	<b>ramete</b> enings	r Netarea A, m²		J-value V/m²K	A x l W/K		kappa-valuk J/m²K	e A x K kJ/K	
Window argon fill soft coat FRON	led, low- t (East)				10.84		.05 (1.10)		.42			(27)
Window	-Double led, low-	-glazed, E, En=0.	1,		3.48	0 1	.05 (1.10)	3	3.67			(27)
Full glaz	glazed, a	rgon fille	d,		7.75	2	1.10	8	3.53			(26)
Walls HALLV	<b>Λ/Δ</b> Υ				15.40	0 0	).13(Ru=0	.85) 2	2.05	70.00	1078.0	0 (29)
Walls		VINDOW	'S & DOC	ND Q	63.5	1	0.15	g	9.53	70.00	4445.5	5 (29)
Flat roof	s	VIINDOVV	Jaboc	, ito	69.17	7	0.13	8	3.99	9.00	622.53	(30)
Party flo	or	/ELLING	BELOW		69.17	7	0.00	C	0.00	40.00	2766.8	0
Total are	ea of ext	ernal ele	ments Si	gma A, ı	m²						170.1	5 (31)
Fabric h		, W/K									44.1	` '
Heat cap			. I. I/m. 21/								8912.8	` ,
Effect of		arameter bridges	, KJ/M²K								128.8 13.3	` ,
Total fab		•									57.4	` ,
		loss calc	ulated m	onthly							07.1	0 (01)
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 tra	nsfer co	efficient,	W/K		JL							
90.80	90.62	90.45	89.63	89.48	88.77	88.77	88.64	89.04	89.48	89.79	90.11	
	JI	JI	JI.	l							89.6	3 (39)
Heat los	s param	eter (HLI	<sup>2</sup> ), W/m²	K								` ,
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 (ave									*	J	1.3	0 (40)
Number	of days	in month	(Table 1	a)								
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
31	28	31	30	31	30	31	31	30	31	30	31	

Assume	er heatin ed occup	ancy, N	•								kWh/year 2.23	(4
Jan	average     Feb	not watei Mar	Apr	May	Jun	ı,average Jul	Aug	Sep	Oct	Nov	91.65 Dec	(•
	er usage	J			J	<b></b>	<u> </u>	<u>  Cop</u>		1.101		
100.81	,	93.48	89.81	86.15	82.48	82.48	86.15	89.81	93.48	97.14	100.81	(
	content of				1			10000				`
149.50	130.75	134.92	117.63	112.87	97.40	90.25	103.57	104.80	122.14	133.32	144.78	
	content (a	annual)	JL		JL	J	JL		JL	J	1441.94	(-
22.42	19.61	20.24	17.64	16.93	14.61	13.54	15.53	15.72	18.32	20.00	21.72	(4
store l	oss dete	rmined fr	om EN 1	3203-21	tests, tak	en from	boiler da	ta record	Ė			
Volume			ctor (kW	h/day)							0.00 0.0000 0.0000	<b>(</b> ;
	ature fact lost from		//h/dav\								0.0000 0.00	(
0,	orage los	,	/vii/day)								0.00	(
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(
Net stor	age loss	J	JL			JI.						
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(
Primary	loss	, I	,		,	Л	А			Л		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(!
Combi l	oss calcu	lated for	each mo	onth					•			
26.43	23.84	26.33	25.41	26.20	25.29	26.10	26.16	25.35	26.28	25.51	26.41	(
Total he	at requir	ed for wa	ter heati	ng calcul	ated for	each mo	nth		,			
175.93	154.59	161.25	143.04	139.07	122.69	116.35	129.73	130.16	148.41	158.84	171.19	(
Output f	rom wate	er heater	for each	month, k	«Wh/mor	nth			J			
175.93	154.59	161.25	143.04	139.07	122.69	116.35	129.73	130.16	148.41	158.84	171.19	(
				n /							1751.26	(
	ins from		·	1	,			T		T		,
56.32	49.44	51.44	45.46	44.08	38.71	36.53	40.98	41.19	47.18	50.71	54.74	(

	rnal	

o. micon								I a			
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Metabo	lic 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
Lighting	ggains										
43.54	38.67	31.45	23.81	17.80	15.03	16.24	21.10	28.33	35.97	41.98	44.75
Applian	ces gains	3					_				
291.57	294.60	286.97	270.74	250.25	230.99	218.13	215.10	222.73	238.96	259.45	278.71
Cooking	g 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
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
Losses	e.g. evap	oration (r	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
Water h	eating ga	ains									
75.69	73.56	69.15	63.14	59.25	53.76	49.10	55.08	57.20	63.41	70.43	73.58
Total int	ternal gai	ns									
508.90	504.93	485.66	455.79	425.39	397.88	381.57	389.38	406.35	436.44	469.95	495.13
Window En=0.1, FRON		e-glazed, t (East)	argon fill	led, low-l	Area E, 0.9		19.64 0	& FF   .63 x 0.8	0 0	hading .77	Gains 74.3615
Window En=0.1, FRON Window En=0.1, REAR Full glaz low-E, E REAR Total so	v - Double , soft coa IT v - Double , soft coa t zed door En=0.1, s	e-glazed, t (East) e-glazed, t (West) - Double- oft coat	argon fill argon fill -glazed, a (West)	led, low-l	Area E, 0.9	x 10.840 x 3.480 <sup>2</sup>	19.64 0	0.63 x 0.8	60 0	•	
Window En=0.1, FRON Window En=0.1, REAR Full glaz low-E, E REAR Total so	v - Double , soft coa IT v - Double , soft coa k zed door En=0.1, s k olar gains	e-glazed, t (East) e-glazed, t (West) - Double- oft coat	argon fill argon fill -glazed, a (West)	led, low-l	Area E, 0.9 E, 0.9 ed, 0.9	x 10.840 x 3.480 <sup>2</sup> x 7.752 <sup>2</sup>	19.64 0 19.64 0 19.64 0	0.63 x 0.8	60 0 60 0	.77 .77 .77	74.3615 23.8721 53.1771 151.41
Window En=0.1, FRON Window En=0.1, REAR Full glaz low-E, E REAR Total so Solar ga	v - Double , soft coa IT v - Double , soft coa c zed door En=0.1, s c blar gains ains	e-glazed, t (East) e-glazed, t (West) - Double- oft coat	argon fill argon fill -glazed, a (West)	led, low-l	Area E, 0.9	x 10.840 x 3.480 <sup>2</sup> x 7.752 <sup>2</sup>	19.64 0	0.63 x 0.8	60 0	.77 .77 .77	74.3615 23.8721 53.1771
Window En=0.1, FRON Window En=0.1, REAR Full glaz low-E, E REAR Total so Solar ga 151.41 Total ga	v - Double, soft coal Tv - Double, soft coal zed door - En=0.1, st blar gains ains	e-glazed, t (East) e-glazed, t (West) - Double- oft coat , January	argon fill argon fill -glazed, a (West)	led, low-led, low-largon fille	Area E, 0.9 E, 0.9 ed, 0.9	x 10.840 x 3.480 <sup>2</sup> x 7.752 <sup>2</sup> 849.69	19.64 0 19.64 0 19.64 0	0.63 x 0.8 0.63 x 0.8 0.63 x 0.8	0 0 0 0 0 0 351.46	.77 .77 .77	74.3615 23.8721 53.1771 151.41
Window En=0.1, FRON Window En=0.1, REAR Full glaz low-E, E REAR Total so Solar ga	v - Double, soft coal Tv - Double, soft coal zed door - En=0.1, st blar gains ains	e-glazed, t (East) e-glazed, t (West) - Double- oft coat	argon fill argon fill -glazed, a (West)	led, low-led, low-largon fille	Area E, 0.9 E, 0.9 ed, 0.9	x 10.840 x 3.480 <sup>2</sup> x 7.752 <sup>2</sup> 849.69	19.64 0 19.64 0 19.64 0	0.63 x 0.8 0.63 x 0.8 0.63 x 0.8	60 0 60 0	.77 .77 .77	74.3615 23.8721 53.1771 151.41
Window En=0.1, FRON Window En=0.1, REAR Full glaz low-E, E REAR Total so Solar ga 151.41 Total ga 660.31	v - Double, soft coal T v - Double, soft coal zed door - En=0.1, solar gains ains 296.19 ains 801.12	e-glazed, t (East) e-glazed, t (West) - Double- oft coat , January 487.79	argon fill argon fill -glazed, a (West)	led, low-led, low-largon fille	Area E, 0.9 E, 0.9 ed, 0.9	x 10.840 x 3.480 <sup>2</sup> x 7.752 <sup>2</sup> 849.69	19.64 0 19.64 0 19.64 0	0.63 x 0.8 0.63 x 0.8 0.63 x 0.8	0 0 0 0 0 0 351.46	.77 .77 .77	74.3615 23.8721 53.1771 151.41
Window En=0.1, FRON Window En=0.1, REAR Full glaz low-E, E REAR Total so Solar ga 151.41 Total ga 660.31	v - Double, soft coal Tv - Double, soft coal zed door - En=0.1, st blar gains ains	e-glazed, t (East) e-glazed, t (West) - Double- oft coat , January 487.79	argon fill argon fill -glazed, a (West)	led, low-led, low-largon fille	Area E, 0.9 E, 0.9 ed, 0.9	x 10.840 x 3.480 <sup>2</sup> x 7.752 <sup>2</sup> 849.69	19.64 0 19.64 0 19.64 0	0.63 x 0.8 0.63 x 0.8 0.63 x 0.8	351.46 787.89	.77 .77 .77 .188.79	74.3615 23.8721 53.1771 151.41 124.51 619.64
Window En=0.1, FRON Window En=0.1, REAR Full glaz low-E, E REAR Total so Solar ga 151.41 Total ga 660.31  Lighting	v - Double, soft coal r v - Double, soft coal r v - Double, soft coal r zed door - En=0.1, s r al r al 296.19 r al al r al al r al al r al al r al r	e-glazed, t (East) e-glazed, t (West) e-glazed, t (West) - Double-oft coat , January 487.79 973.45 e-glazed,	argon fill argon fill -glazed, a (West) /	led, low-led, low-largon fillo	Area E, 0.9 E, 0.9 ed, 0.9 1290.38	x 10.840 x 3.480 <sup>2</sup> x 7.752 <sup>2</sup> 849.69	19.64 0 19.64 0 19.64 0 729.88	0.63 x 0.8 0.63 x 0.8 0.63 x 0.8 567.31	0 0 0 0 0 0 351.46 787.89	.77 .77 .77	74.3615 23.8721 53.1771 151.41 124.51 619.64

	n interna				,	<b>T</b> I 4 (0	.0\				04.00
	rature du g system i			as in the	living are	ea, In1 (°	(C)				21.00 1.00
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
au	1.00	IVIGI	7 (5)	iviay	Joan	Joan		ТООР		1400	1000
27.27	27.32	27.37	27.62	27.67	27.89	27.89	27.93	27.80	27.67	27.57	27.48
	21.32	21.31	27.02	27.07	27.09	27.09	21.93	27.00	27.07	21.31	27.40
alpha	0.00	0.00	0.04	0.04	0.00	0.00	0.00	0.05	0.04	0.04	0.00
2.82	2.82	2.82	2.84	2.84	2.86	2.86	2.86	2.85	2.84	2.84	2.83
	on factor	~	,	1	1		1	1	1		
0.94	0.91	0.84	0.71	0.56	0.42	0.31	0.35	0.56	0.80	0.92	0.95
	nternal te		,	_		1	1	Υ	1		
19.12	19.46	19.95	20.46	20.78	20.93	20.98	20.97	20.84	20.36	19.64	19.05
	rature du		,			,		V	2	10	
19.83	19.83	19.83	19.84	19.85	19.85	19.85	19.86	19.85	19.85	19.84	19.84
Utilisati	on factor	for gains	for rest	of dwellir							
0.93	0.89	0.81	0.67	0.51	0.35	0.23	0.27	0.48	0.76	0.90	0.94
Mean ir	nternal te	mperatui	re in the r	est of dw	elling T2	2					
17.39	17.87	18.55	19.24	19.63	19.80	19.84	19.84	19.72	19.13	18.14	17.29
_	irea fracti iternal tei	`	,		welling)						0.42
18.12	18.54	19.14	19.75	20.11	20.28	20.32	20.31	20.19	19.65	18.77	18.03
	djustmer	J			J				10100		
18.12	18.54	19.14	19.75	20.11	20.28	20.32	20.31	20.19	19.65	18.77	18.03
		1						1=00	10.00		10.00
8. Spac	ce heatir	ıg requii	rement								
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisati	on factor	for gains	5		,				Л		
0.92	0.87	0.79	0.67	0.52	0.37	0.26	0.30	0.51	0.75	0.88	0.93
Useful	gains	,		,	,	JI.	ı		,		
604.21	698.61	773.62	780.95	676.18	482.45	324.51	338.33	491.85	590.84	579.94	573.40
Monthly	_ /average	external		ture	JL		JL		JI		
4.30	4.90	6.50	8.90	11.70	14.60	16.60	16.40	14.10	10.60	7.10	4.20
	ss rate fo						10110	1	10.00		
	2 1235.74				503.89	330.15	346.79	542.40	809.69	1047 66	1246.37
	n of mont			7.02.00	000.00	300.10	0.0.70	10 12.40	_ 555.55	10 17 .00	1 12 10.07
1.00	1.00	1.00	1.00	1.00	1_		-	-	1.00	1.00	1.00
	neating re				-   k\\/h/~	onth.	J	J	1.00	1.00	1.00
					i, KVVII/II	1011111		1	160.00	226.76	E00.00
483.83		275.08			(14) (15)	- (0 -4 -	-  -	-	162.82	336.76	500.69
	pace hear neating re	•		•	` •	ar) (Octo	per to Ma	ay)			2315.26 33.47
space i	reating re	quireme	in perm	- (KVVII/M	ryear)						33.47

## 8c. Space cooling requirement - not applicable

9a. Ene	rgy requ	iiremen	ts									
No seco	ndary he	ating sy	stem sel	ected							kWh/year	
	of space by of mail			• ,	s)				1.0000 3.20%			(202) (206)
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Spaceh	eating re	quireme	nt		,							
483.83	360.95	275.08	138.09	57.04	-	-	-	-	162.82	336.76	500.69	(98)
Appendi	ix Q - mo	nthly en	ergy sav	ed (main	heating	system '	1)		JI.	JL		
0.00	0.00	0.00	0.00	0.00	-	-	-	-	0.00	0.00	0.00	(210)
Space h	eating fu	el (main	heating	system ′	I)				JL	Л		
519.13	387.29	295.15	148.16	61.20	<u></u>	-	-	1-	174.70	361.33	537.22	(211)
	ix Q - mo				heating	svstem 2	 2)					` ,
0.00	0.00	0.00	0.00	0.00	1-	1-	<u>'</u>	1-	0.00	0.00	0.00	(212)
	eating fu				2)			J	0.00	0.00	0.00	(= : =)
0.00	0.00	0.00	0.00	0.00	-,  -		1_	1_	0.00	0.00	0.00	(213)
	ix Q - mo				ndary he	ating sys	stem)	J	0.00	0.00	0.00	(210)
	0.00	0.00	0.00	0.00				1-	0.00	0.00	0.00	(214)
0.00	eating fu			0.00	<u> -</u>	-		<u> -</u>	0.00	0.00	0.00	(214)
		,	,	0.00	1			Υ	0.00	0.00		(045)
0.00	0.00	0.00	0.00	0.00		-	-	<u> </u> -	0.00	0.00	0.00	(215)
Water he	eating eating red	nuiromor	nt.									
_			nr.	120.07	400.00	440.05	400.70	120.40	4 40 44	450.04	174 40	(64)
175.93		161.25	143.04	139.07	122.69	116.35	129.73	130.16	148.41	158.84	171.19	(64)
	cy of wate	,	nr.	00.40	07.00	07.00	07.00	107.00	00.70	00.05	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)
	eating fue	,		1	1	1	1	,	nr			
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 t	totals										kWh/year	
Space h	eating fu	el used,	main sy	stem 1							2484.19	(211)
•	eating fu	•	ndary)								0.00	(215)
	eating fue										1977.93	(219)
	ty for pur		s and ele	ectric kee	ep-hot						20.00	(220-)
	ا heating vith a fan		d fluo								30.00 45.00	(230c) (230e)
	ectricity fo			n/vear							75.00	(231)
	ty for ligh			-							307.57	(232)
	saving/ge										001.01	(202)
	.80 x 0.9										777.258	
PVs 0	.80 x 0.0	0.0 x 0.0	00 x 0.50	00							0.000	
PVs 0	.80 x 0.0	0.0 x 0.0	00 x 0.50	00							0.000	
											777.258	(233)
Appendi		r genera	atod ():								0.000	(2362)
	y saved c y used ()	-	iieu ().								0.000	(236a) (237a)
Litera	, uscu ()	•									0.000	(201a)
Total de	livered er	nergy for	all uses								4067.43	(238)

10a	Fuel	costs	เมรากต	Table	12	prices
ıva.	ı ucı	CUSIS	usiiiu	Iabic	12	มเเษยง

,	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)
CAP. I			0.82	(257)
SAPvalue			88.54	(050)
			89	(258)
SAP band			В	

#### 12a. Carbon dioxide emissions

	Energy	<b>Emission factor</b>	Emissions kg CO2/year	
	kWh/year	kg CO2/kWh		
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)
Waterheating	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 m <sup>2</sup>			10.97	(273)
Elvalue			91.09	(273a)
El rating			91	(274)
El band			В	

# Calculation of stars for heating and DHW

Main heating energy efficiency
Main heating environmental impact
Water heating energy efficiency
Water heating environmental impact

 $(3.48 / 0.9020) \times (1 + (0.29 \times 0.00)) = 3.8581$ , stars = 4  $(0.2160 / 0.9020) \times (1 + (0.29 \times 0.00)) = 0.2395$ , stars = 4 3.48 / 0.8844 = 3.9347, stars = 4 0.2160 / 0.8844 = 0.2442, stars = 4

#### Page 8 of 10

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Approval of JPA Designer by BRE applies only to the software, data is not subject to quality control procedures, users are themselves responsible for the accuracy of the data. The results of the calculation should not be accepted without first checking the input data.

Building type Top-floorflat

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

1 TER and DER

Fuel for main heating system: Gas (mains) (fuel factor = 1.00)

Target Carbon Dioxide Emission Rate
Dwelling Carbon Dioxide Emission Rate

TER = n/a DER = 12.24

OK

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE) TFEE = 57.2

Dwelling Fabric Energy Efficiency (DFEE)

DFEE = n/a

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

2b Fabric U-values

Element **Highest** <u>Average</u> 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 1.10 (max. 2.00) 1.10 (max. 3.30) **Openings** OK

3 Air permeability

Air permeability at 50 pascals: 3.90
Maximum: 10.00

OK

OK

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%

Secondary heating system:

None-

Page 9 of 10

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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

No cylinder

Boiler Interlock Yes OK

Hot water controls No cylinder

7 Low energy lights

Hot water controls

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):

Medium OK

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/m<sup>2</sup>K

Walls U-value 0.13 W/m<sup>2</sup>K

Design air permeability 3.9 m<sup>3</sup>/h.m<sup>2</sup>

Photovoltaic array