BRUKL Output Document

Compliance with England Building Regulations Part L 2021

⊛ HM Government

Project name

Bayham Street - Existing (Baseline)

As designed

Date: Mon Apr 08 13:42:59 2024

Administrative information

Building Details

Address: 101 Bayham Street, London,

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.25

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.25

BRUKL compliance module version: v6.1.e.1

Foundation area [m²]: 404.69

The CO_2 emission and primary energy rates of the building must not exceed the targets

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2$annum	6.78	
Building CO_2 emission rate (BER), $kgCO_2/m^2$annum	15.89	
Target primary energy rate (TPER), kWh_{PE}/m^2annum	73.87	
Building primary energy rate (BPER), kWh_{PE}/m^2annum	168.96	
Do the building's emission and primary energy rates exceed the targets?	BER > TER	BPER > TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	1.15	1.15	FN000000:Surf[0]
Floors	0.18	0.3	0.3	FN00018E:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	2.78	2.78	SP00000B:Surf[0]
Windows** and roof windows	1.6	2.2	2.2	FN00018E:Surf[1]
Rooflights***	2.2	3.4	3.4	SP00000C:Surf[5]
Personnel doors^	1.6	1.6	1.6	00000000:Surf[2]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [W/(m²K)] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [W/(m²K)]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [W/(m²K)]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check.   *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m²K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m³/(h.m²) at 50 Pa	8	25

Building services

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Electric Heating with Natural Vent

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

2- Electric Heating with MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	-	0.7
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

3- ASHP (Heating and Cooling) + MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.5	5	0	2	0.7
Standard value	2.5*	N/A	N/A	2^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

1- DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.005
Standard value	1	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I	**Zone**	**Standard**
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1		
02_WC	-	-	-	2	-	-	-	-	-	-	N/A
02_WC	-	-	-	2	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
01_WC	-	-	-	2	-	-	-	-	-	-	N/A
01_WC	-	-	-	2	-	-	-	-	-	-	N/A
03_WC	-	-	-	2	-	-	-	-	-	-	N/A
03_WC	-	-	-	2	-	-	-	-	-	-	N/A
04_WC	-	-	-	2	-	-	-	-	-	-	N/A
04_WC	-	-	-	2	-	-	-	-	-	-	N/A
00_Storage	-	-	-	-	-	-	-	0.4	-	-	N/A
00_WC Lobby	-	-	-	2	-	-	-	-	-	-	N/A
00_WC	-	-	-	2	-	-	-	-	-	-	N/A
00_Comms	-	-	-	-	-	-	-	0.4	-	-	N/A
00_WC	-	-	-	2	-	-	-	-	-	-	N/A
00_Office	-	-	-	-	-	-	-	0.4	-	-	N/A
00_Office	-	-	-	-	-	-	-	0.4	-	-	N/A
00_BMS Office	-	-	-	-	-	-	-	0.4	-	-	N/A
00_WC	-	-	-	2	-	-	-	-	-	-	N/A
00_Corridor	-	-	-	-	-	-	-	0.4	-	-	N/A
00_Entrance Lobby / Reception	-	-	-	-	-	-	-	0.4	-	-	N/A
00_Waiting Area	-	-	-	-	-	-	-	0.4	-	-	N/A
-01_WC	-	-	-	2	-	-	-	-	-	-	N/A
-01_Showers/Lockers	-	-	-	2	-	-	-	-	-	-	N/A
04_Office	-	-	-	-	-	-	-	0.4	-	-	N/A
01_Office	-	-	-	-	-	-	-	0.4	-	-	N/A
02_Office	-	-	-	-	-	-	-	0.4	-	-	N/A
03_Office	-	-	-	-	-	-	-	0.4	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
01_Stairs	60	-	-
01_Stairs	60	-	-
02_Stairs	60	-	-
02_Stairs Lobby	60	-	-
02_WC	60	-	-
02_WC	60	-	-
01_WC	60	-	-
01_WC	60	-	-
03_Stairs	60	-	-
03_Stairs Lobby	60	-	-
03_WC	60	-	-
03_WC	60	-	-
04_Stairs	60	-	-
04_WC	60	-	-
04_WC	60	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
01_Stairs	60	-	-
02_Stairs	60	-	-
03_Stairs	60	-	-
04_Stairs	60	-	-
00_Storage	60	-	-
00_Technick Room	60	-	-
00_Storage	60	-	-
00_WC Lobby	60	-	-
00_WC	60	-	-
00_Comms	60	-	-
00_WC	60	-	-
00_Stairs	60	-	-
00_Office	60	-	-
00_LV Switch Room	60	-	-
00_Office	60	-	-
00_BMS Office	60	-	-
00_WC	60	-	-
00_Corridor	60	-	-
00_Entrance Lobby / Reception	60	100	1.35
00_Waiting Area	60	-	-
00_Bin Store	60	-	-
00_Stairs	60	-	-
00_Substation	60	-	-
-01_Bike Storage	60	-	-
-01_Lift Lobby	60	-	-
-01_Plant Room	60	-	-
-01_Stairs	60	-	-
-01_WC	60	-	-
-01_Showers/Lockers	60	-	-
00_Entrance	60	-	-
04_Office	60	-	-
01_Office	60	-	-
02_Office	60	-	-
03_Office	60	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00_Storage	N/A	N/A
00_Comms	N/A	N/A
00_Office	YES (+100.4%)	NO
00_Office	YES (+63.9%)	NO
00_BMS Office	N/A	N/A
00_Corridor	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
00_Entrance Lobby / Reception	YES (+22.7%)	NO
00_Waiting Area	YES (+46%)	NO
04_Office	YES (+66.4%)	NO
01_Office	YES (+16.4%)	NO
02_Office	YES (+24.6%)	NO
03_Office	YES (+11.5%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	2664.9	2664.9
External area [m²]	2940.7	2940.7
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	25	3
Average conductance [W/K]	4400.58	1234.53
Average U-value [W/m²K]	1.5	0.42
Alpha value* [%]	25.17	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
100	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	43.54	2.74
Cooling	3.12	3.84
Auxiliary	20.96	8.2
Lighting	10.81	7.36
Hot water	31.77	28.67
Equipment*	42.98	42.98
TOTAL**	**110.2**	**50.82**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	0.73
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*0.73*

Energy & CO$_2$ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	314.23	85.96
Primary energy [kWh$_{PE}$/m²]	168.96	73.87
Total emissions [kg/m²]	15.89	6.78

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Fan coil systems, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	293.3	51.1	37.3	3.9	25.6	2.19	3.62	2.5	5
	Notional	20.2	80.5	2	4.8	10.2	2.78	4.63	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	341.9	0	118.7	0	9.2	0.8	0	1	0
	Notional	30.1	0	5.9	0	1.5	1.41	0	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	364.7	0	126.6	0	0	0.8	0	1	0
	Notional	80	0	15.8	0	0	1.41	0	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
Heat con [kWh/m2] = Heating energy consumption
Cool con [kWh/m2] = Cooling energy consumption
Aux con [kWh/m2] = Auxiliary energy consumption
Heat SSEFF = Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER = Cooling system seasonal energy efficiency ratio
Heat gen SSEFF = Heating generator seasonal efficiency
Cool gen SSEER = Cooling generator seasonal energy efficiency ratio
ST = System type
HS = Heat source
HFT = Heating fuel type
CFT = Cooling fuel type