BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

16 Strawberry Hill Road

As designed

Date: Thu Aug 29 15:43:53 2024

Administrative information

Building Details

Address: 16 Strawberry Hill Road, Twickenham, Greater London, TW1 4PT

Certifier details

Name: Mr Sean Mills

Telephone number: 01202280062

Address: Aerodrome Studios, 2-8 Airfield Rd,, Christchurch, BH23 3TS

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.1

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.26

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

Foundation area [m^2]: 141.2

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

Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	4.18	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	-0.02	
Target primary energy rate (TPER), kWh_{PE}/m^2.annum	43.95	
Building primary energy rate (BPER), kWh_{PE}/m^2.annum	-3.84	
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	0.2	0.22	0G000009_W2_A0
Floors	0.18	0.25	0.25	0G000002_F
Pitched roofs	0.16	0.12	0.12	2S00000D_C
Flat roofs	0.18	0.13	0.13	0G000002_C_A0
Windows** and roof windows	1.6	1.2	1.2	0G000004_W1_O0
Rooflights***	2.2	1.2	1.2	2S000001_C_O0
Personnel doors^	1.6	2.2	2.2	0G000006_W1_O0
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* 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/m^2K

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
$m^3/(h.m^2)$ at 50 Pa	8	15*

* Buildings with less than 500 m^2 total useful floor area may avoid the need for a pressure test provided that the air permeability used to calculate the BER and BPER is taken as 15 $m^3/(h.m^2)$ at 50 Pa.

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- ASHP (Heat) 4.5

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	4.5	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

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

2- ASHP (DHW) 4.5

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	4.5	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

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

1- SYST0001-DHW

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	Hot water provided by HVAC system	-
Standard value	N/A	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**		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	**Zone**	**Standard**
0GF WC	0.3	-	-	-	-	-	-	-	-	-	N/A
0GF Bathroom	0.3	-	-	-	-	-	-	-	-	-	N/A
0GF Kitchen	0.3	-	-	-	-	-	-	-	-	-	N/A
0GF Kitchen	0.3	-	-	-	-	-	-	-	-	-	N/A
0GF Shower	0.3	-	-	-	-	-	-	-	-	-	N/A
0GF Shower	0.3	-	-	-	-	-	-	-	-	-	N/A
0GF Kitchen	0.3	-	-	-	-	-	-	-	-	-	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
1FF WC	0.3	-	-	-	-	-	-	-	-	-	N/A
1FF Ensuite	0.3	-	-	-	-	-	-	-	-	-	N/A
1FF WC	0.3	-	-	-	-	-	-	-	-	-	N/A
1FF Bathroom	0.3	-	-	-	-	-	-	-	-	-	N/A
2SF Bathroom	0.3	-	-	-	-	-	-	-	-	-	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
0GF WC	120	-	-
0GF Bathroom	120	-	-
0GF Kitchen	120	-	-
0GF Guest Room	120	-	-
0GF Halls	120	-	-
0GF Guest Room	120	-	-
0GF Living Room	120	-	-
0GF Reception	120	-	-
0GF Halls	120	-	-
0GF Kitchen	120	-	-
0GF Dining	120	-	-
0GF Halls	120	-	-
0GF Halls	120	-	-
0GF Shower	120	-	-
0GF Shower	120	-	-
0GF Kitchen	120	-	-
0GF Kitchen Larder	120	-	-
0GF Kitchen Larder	120	-	-
0GF Halls	120	-	-
1FF Halls	120	-	-
1FF Walk in Closet	120	-	-
1FF WC	120	-	-
1FF Ensuite	120	-	-
1FF Master Bedroom	120	-	-
1FF Halls	120	-	-
1FF Bedroom 3	120	-	-
1FF WC	120	-	-
1FF Bathroom	120	-	-
1FF Bedroom 2	120	-	-
2SF Hallway	120	-	-
2SF Cupboard	120	-	-
2SF Bedroom 5	120	-	-
2SF Bedroom 4	120	-	-
2SF Bathroom	120	-	-

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
2SF Hallway	120	-	-
2SF Bedroom 3	120	-	-
2SF Play Room	120	-	-

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?
0GF Kitchen	NO (-29.4%)	NO
0GF Guest Room	NO (-49%)	NO
0GF Guest Room	NO (-50.9%)	NO
0GF Living Room	NO (-60.2%)	NO
0GF Kitchen	NO (-80.4%)	NO
0GF Dining	NO (-70.2%)	NO
0GF Kitchen	NO (-80.5%)	NO
0GF Kitchen Larder	N/A	N/A
0GF Kitchen Larder	N/A	N/A
1FF Walk in Closet	N/A	N/A
1FF Master Bedroom	NO (-62.1%)	NO
1FF Bedroom 3	NO (-64.7%)	NO
1FF Bedroom 2	NO (-58%)	NO
2SF Cupboard	N/A	N/A
2SF Bedroom 5	NO (-65.2%)	NO
2SF Bedroom 4	NO (-72.6%)	NO
2SF Bedroom 3	NO (-86.8%)	NO
2SF Play Room	NO (-83%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

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

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	423.6	423.6
External area [m^2]	891.5	891.5
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	15	3
Average conductance [W/K]	255.34	384.83
Average U-value [W/m^2K]	0.29	0.43
Alpha value* [%]	38.59	29.89

* 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
	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
100	**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/m^2]

	Actual	Notional
Heating	11.32	12.43
Cooling	0	0
Auxiliary	1.45	3.82
Lighting	4.24	4.76
Hot water	3.04	8.19
Equipment*	16.11	16.11
TOTAL**	**20.05**	**29.2**

* 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/m^2]

	Actual	Notional
Photovoltaic systems	23.92	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*23.92*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	196.36	178.05
Primary energy [kWh_{PE}/m^2]	-3.84	43.95
Total emissions [kg/m^2]	-0.02	4.18

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] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	172.3	24.1	11.3	0	1.4	4.23	0	4.5	0
	Notional	118.1	59.9	12.4	0	1.5	2.64	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