BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Lambeth College Portacabins - As Designed

As designed

Date: Wed Jul 26 11:59:17 2023

Administrative information

Building Details

Address:

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.2.0

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

Certifier details

Name: Mr Robert Rossall

Telephone number: 0151 933 0328

Address: Base Energy 202 Stanley Road, Bootle, L20 3EN

Foundation area [m^2]: 713.28

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

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	4.7	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	3.93	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	50.35	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	42.05	
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	0.32	0.32	Block 1 FF - Dis WC_W_5
Floors	0.18	0.25	0.25	Block 1 GF - Kitchen_S_3
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.25	0.25	Block 1 GF - Stairwell_R_12
Windows** and roof windows	1.6	1.6	1.6	Block 1 GF - Canteen_G_8
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	1.6	1.6	Block 1 GF - Canteen_D_11
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	5

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	>0.95

1- Electric Heater - Unfanned

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	1	-	-	-	-
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- Split System

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	5	5	-	-	-
Standard value	2.5*	5	N/A	N/A	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.					

1- IDHW

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	1	-
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**		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	**Zone**	**Standard**
Block 1 GF - Kitchen	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 1 GF - Female WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 1 GF - Male WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 1 GF - Dis WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 1 FF - Female WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 1 FF - Male WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 1 SF - Female WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 1 SF - Male WC	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
Block 1 SF - Dis WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 2 GF - Male WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 2 GF - Dis WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 2 GF - Female WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 2 FF - Male WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 2 FF - Dis WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 2 FF - Female WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 2 SF - Male WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 2 SF - Dis WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Block 2 SF - Female WC	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
Block 1 FF - Dis WC	110	-	-
Block 1 GF - Kitchen	110	-	-
Block 1 GF - Female WC	110	-	-
Block 1 GF - Circulation	110	-	-
Block 1 GF - Male WC	110	-	-
Block 1 GF - Canteen	110	-	-
Block 1 GF - Dis WC	110	-	-
Block 1 GF - Stairwell	110	-	-
Block 1 FF - LRC	110	-	-
Block 1 FF - Female WC	110	-	-
Block 1 FF - Circulation	110	-	-
Block 1 FF - Male WC	110	-	-
Block 1 SF - LRC	110	-	-
Block 1 SF - Female WC	110	-	-
Block 1 SF - Circulation	110	-	-
Block 1 SF - Male WC	110	-	-
Block 1 SF - Dis WC	110	-	-
Block 2 GF - Male WC	110	-	-
Block 2 GF - Dis WC	110	-	-
Block 2 GF - Circulation 1	110	-	-
Block 2 GF - Female WC	110	-	-
Block 2 GF - Canteen	110	-	-
Block 2 GF - 25 Pupil Classroom 1	110	-	-
Block 2 GF - Stairwell 1	110	-	-
Block 2 GF - Comms Room	110	-	-
Block 2 GF - Cookery School	110	-	-
Block 2 GF - 3 Person Consultant 1	110	-	-
Block 2 GF - 3 Person Consultant	110	-	-
Block 2 GF - 3 Person Concultant	110	-	-

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
Block 2 GF - 25 Pupil Classroom	110	-	-
Block 2 GF - Circulation	110	-	-
Block 2 GF - Stairwell	110	-	-
Block 2 FF - Male WC	110	-	-
Block 2 FF - Dis WC	110	-	-
Block 2 FF - Circulation	110	-	-
Block 2 FF - Female WC	110	-	-
Block 2 FF - Classroom for 20 Pupils 1	110	-	-
Block 2 FF - Classroom for 25 Pupils 1	110	-	-
Block 2 FF - Classroom for 20 Pupils 2	110	-	-
Block 2 FF - Classroom for 20 Pupils	110	-	-
Block 2 FF - Classroom for 25 Pupils 2	110	-	-
Block 2 FF - Classroom for 25 Pupils 3	110	-	-
Block 2 FF - Classroom for 25 Pupils	110	-	-
Block 2 SF - Male WC	110	-	-
Block 2 SF - Dis WC	110	-	-
Block 2 SF - Circulation	110	-	-
Block 2 SF - Female WC	110	-	-
Block 2 SF - Classroom for 20 Pupils 1	110	-	-
Block 2 SF - Classroom for 25 Pupils 1	110	-	-
Block 2 SF - Classroom for 20 Pupils 2	110	-	-
Block 2 SF - Classroom for 20 Pupils	110	-	-
Block 2 SF - Classroom for 25 Pupils 2	110	-	-
Block 2 SF - Classroom for 25 Pupils 3	110	-	-
Block 2 SF - Classroom for 25 Pupils	110	-	-

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?
Block 1 FF - Dis WC	N/A	N/A
Block 1 GF - Kitchen	N/A	N/A
Block 1 GF - Female WC	N/A	N/A
Block 1 GF - Circulation	N/A	N/A
Block 1 GF - Male WC	N/A	N/A
Block 1 GF - Canteen	NO (-63.4%)	NO
Block 1 GF - Dis WC	N/A	N/A
Block 1 GF - Stairwell	N/A	N/A
Block 1 FF - LRC	NO (-58.8%)	NO
Block 1 FF - Female WC	N/A	N/A
Block 1 FF - Circulation	N/A	N/A
Block 1 FF - Male WC	N/A	N/A
Block 1 SF - LRC	NO (-58.8%)	NO
Block 1 SF - Female WC	N/A	N/A
Block 1 SF - Circulation	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Block 1 SF - Male WC	N/A	N/A
Block 1 SF - Dis WC	N/A	N/A
Block 2 GF - Male WC	N/A	N/A
Block 2 GF - Dis WC	N/A	N/A
Block 2 GF - Circulation 1	N/A	N/A
Block 2 GF - Female WC	N/A	N/A
Block 2 GF - Canteen	NO (-32.3%)	NO
Block 2 GF - 25 Pupil Classroom 1	NO (-58.1%)	NO
Block 2 GF - Stairwell 1	N/A	N/A
Block 2 GF - Comms Room	NO (-6.8%)	NO
Block 2 GF - Cookery School	NO (-14.1%)	NO
Block 2 GF - 3 Person Consultant 1	NO (-14.7%)	NO
Block 2 GF - 3 Person Consultant	NO (-13.4%)	NO
Block 2 GF - 3 Person Concultant	NO (-60.5%)	NO
Block 2 GF - 25 Pupil Classroom	NO (-57.8%)	NO
Block 2 GF - Circulation	N/A	N/A
Block 2 GF - Stairwell	N/A	N/A
Block 2 FF - Male WC	N/A	N/A
Block 2 FF - Dis WC	N/A	N/A
Block 2 FF - Circulation	N/A	N/A
Block 2 FF - Female WC	N/A	N/A
Block 2 FF - Classroom for 20 Pupils 1	NO (-11.5%)	NO
Block 2 FF - Classroom for 25 Pupils 1	NO (-57.6%)	NO
Block 2 FF - Classroom for 20 Pupils 2	NO (-14.5%)	NO
Block 2 FF - Classroom for 20 Pupils	NO (-41.1%)	NO
Block 2 FF - Classroom for 25 Pupils 2	NO (-59.8%)	NO
Block 2 FF - Classroom for 25 Pupils 3	NO (-34.9%)	NO
Block 2 FF - Classroom for 25 Pupils	NO (-34.7%)	NO
Block 2 SF - Male WC	N/A	N/A
Block 2 SF - Dis WC	N/A	N/A
Block 2 SF - Circulation	N/A	N/A
Block 2 SF - Female WC	N/A	N/A
Block 2 SF - Classroom for 20 Pupils 1	NO (-11.5%)	NO
Block 2 SF - Classroom for 25 Pupils 1	NO (-57.6%)	NO
Block 2 SF - Classroom for 20 Pupils 2	NO (-14.5%)	NO
Block 2 SF - Classroom for 20 Pupils	NO (-41.1%)	NO
Block 2 SF - Classroom for 25 Pupils 2	NO (-59.8%)	NO
Block 2 SF - Classroom for 25 Pupils 3	NO (-34.9%)	NO
Block 2 SF - Classroom for 25 Pupils	NO (-34.7%)	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?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	2139.8	2139.8
External area [m^2]	3776.1	3776.1
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	5	3
Average conductance [W/K]	1409.29	1754.69
Average U-value [W/m^2K]	0.37	0.46
Alpha value* [%]	17.26	19.85

* 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
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
100	**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	7.65	10.87
Cooling	3.02	5.73
Auxiliary	1.27	1.69
Lighting	5.99	5.3
Hot water	10.28	10.28
Equipment*	21.12	21.12
TOTAL**	**28.21**	**33.88**

* 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	0	0.04
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*0.04*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	164.66	194.06
Primary energy [kWh_{PE}/m^2]	42.05	50.35
Total emissions [kg/m^2]	3.93	4.7

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] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Natural Gas										
	Actual	298	28.6	103.5	0	0	0.8	0	1	0
	Notional	290.3	230.2	60.2	0	0	1.34	0	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	125.7	38.7	7.5	3	1.3	4.66	3.55	5	5
	Notional	102.6	91	10.8	5.7	1.7	2.64	4.4	----	----

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