BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name **Shell and Core**

Be Green

As designed

Date: Thu Dec 08 23:14:40 2022

Administrative information

Building Details

Address: Units 1, 2 & 3, Willow Way, Lewisham, London, SE26

Certifier details

Name: Jonathan Wilson

Telephone number: 01892 315 466

Address: Energytest (Commercial) Ltd, 4 St John's Road Tunbridge Wells, Kent TN4 9NP

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.d.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.1.3

BRUKL compliance module version: v6.1.d.0

Foundation area [m^2]: 271.92

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	3.03	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	1.64	
Target primary energy rate (TPER), kWh/m^2.annum	32.8	
Building primary energy rate (BPER), kWh/m^2.annum	17.06	
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	0.17	0.17	Block 1 - Unit 1 Workshop_W_7
Floors	0.18	0.09	0.11	Block 2 - Unit 3 Workshop_S_3
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.13	0.13	Block 1 - Unit 1 Workshop_R_18
Windows** and roof windows	1.6	1.4	1.4	Block 1 - Unit 1 Workshop_G_9
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	1.2	1.2	Block 1 - Unit 1 Workshop_D_15
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	3

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	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Air-Conditioning Units

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	4.2	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- Instantaneous Hot Water Heater

	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 - Unit 1 Workshop	-	-	-	-	1	-	-	-	-	0.8	N/A
Block 2 - Unit 2 Workshop	-	-	-	-	1	-	-	-	-	0.8	N/A
Block 2 - Unit 3 Workshop	-	-	-	-	1	-	-	-	-	0.8	N/A
Block 4 - Unit 1 Mezzanine	-	-	-	-	1	-	-	-	-	0.8	N/A
Block 6 - Unit 2 Mezzanine	-	-	-	-	1	-	-	-	-	0.8	N/A
Block 6 - Unit 3 Mezzanine	-	-	-	-	1	-	-	-	-	0.8	N/A

Shell and core configuration

Zone	**Assumed shell?**
Block 1 - Unit 1 Workshop	NO
Block 2 - Unit 2 Workshop	NO
Block 2 - Unit 3 Workshop	NO
Block 4 - Unit 1 Mezzanine	NO
Block 6 - Unit 2 Mezzanine	NO
Block 6 - Unit 3 Mezzanine	NO

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 - Unit 1 Workshop	115	-	-
Block 2 - Unit 2 Workshop	115	-	-
Block 2 - Unit 3 Workshop	115	-	-
Block 4 - Unit 1 Mezzanine	115	-	-
Block 6 - Unit 2 Mezzanine	115	-	-
Block 6 - Unit 3 Mezzanine	115	-	-

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 - Unit 1 Workshop	NO (-63.6%)	NO
Block 2 - Unit 2 Workshop	NO (-53.8%)	NO
Block 2 - Unit 3 Workshop	NO (-18.4%)	NO
Block 4 - Unit 1 Mezzanine	NO (-82.6%)	NO
Block 6 - Unit 2 Mezzanine	NO (-37.8%)	NO
Block 6 - Unit 3 Mezzanine	NO (-75.2%)	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?	YES
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]	1631.5	1631.5
External area [m^2]	2298.4	2298.4
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	3	4
Average conductance [W/K]	915.48	708.48
Average U-value [W/m^2K]	0.4	0.31
Alpha value* [%]	17.8	44.32

* 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/m^2]

	Actual	Notional
Heating	2.6	3.48
Cooling	1.65	3.24
Auxiliary	2.58	1.38
Lighting	6.74	11.95
Hot water	2.12	2.12
Equipment*	26.92	26.92
TOTAL**	**15.68**	**22.16**

* 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	4.71	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*4.71*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	59.73	64.57
Primary energy [kWh/m^2]	17.06	32.8
Total emissions [kg/m^2]	1.64	3.03

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] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	36.6	23.1	2.6	1.6	2.6	3.91	3.91	4.2	5.5
	Notional	33.1	31.5	3.5	3.2	1.4	2.64	2.7	----	----

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