BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Parliament Hill School

As built

Date: Tue Sep 04 15:17:25 2018

Administrative information

Building Details

Address: LASWAP SIXTH FORM, Parliament Hill School, Highgate Road, LONDON, NW5 1RL

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.4.b.0

Interface to calculation engine: iSBEM

Interface to calculation engine version: v5.4.b

BRUKL compliance check version: v5.4.b.0

Owner Details

Name: Parliament Hill School

Telephone number: 02074857077

Address: Highgate Road, London, NW5 1RL

Certifier details

Name: Barry McCaffrey - FMC Services Ltd

Telephone number: 02880 757573

Address: 6 Moylagh Meadows, Beragh, BT79 0UG

Criterion 1: The calculated CO_2 emission rate for the building must not exceed the target

CO_2 emission rate from the notional building, kgCO_2/m^2.annum	12.8
Target CO_2 emission rate (TER), kgCO_2/m^2.annum	12.8
Building CO_2 emission rate (BER), kgCO_2/m^2.annum	8.2
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.21	0.48	Z0/07/ei
Floor	0.25	0.07	0.1	Z0/25/f
Roof	0.25	0.13	0.13	Z0/01/c
Windows***, roof windows, and rooflights	2.2	1.4	1.6	Z0/01/w/g
Personnel doors	2.2	-	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

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

* There might be more than one surface where the maximum U-value occurs.
** 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.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
m^3/(h.m^2) at 50 Pa	10	3

Building services

The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.

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- HVAC - U/F Heating

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.99	-	-	-	-
Standard value	0.91*	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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.

1- HWS 1

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.143
Standard value	1	N/A

2- HWS 2

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.143
Standard value	1	N/A

3- HWS 3

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.143
Standard value	1	N/A

4- HWS 4

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.143
Standard value	1	N/A

5- No HW

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

6- HWS 5

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.143
Standard value	1	N/A

Local mechanical ventilation, exhaust, and terminal units

ID	System type in Non-domestic Building Services Compliance Guide
A	Local supply or extract ventilation units serving a single area
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 supply and extract ventilation units serving a single room or zone with heating and heat recovery
E	Local supply and extract ventilation system serving a single area with heating and heat recovery
F	Other local ventilation units
G	Fan-assisted terminal VAV unit
H	Fan coil units
I	Zonal extract system where the fan is remote from the zone with grease filter

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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
Z0/08	-	-	-	-	-	-	-	-	-	-	N/A
Z0/09	-	-	-	-	-	-	-	-	-	-	N/A
Z0/01	-	-	-	1.5	-	-	-	-	-	0.9	0.65
Z0/02	-	-	-	1.5	-	-	-	-	-	0.9	0.65
Z0/03	-	-	-	1.5	-	-	-	-	-	0.9	0.65
Z0/04	-	-	-	-	-	-	-	-	-	-	N/A
Z0/05	-	-	-	1.8	-	-	-	-	-	0.9	0.65
Z0/06	-	-	-	1.8	-	-	-	-	-	0.9	0.65
Z0/07	-	-	-	1.8	-	-	-	-	-	0.9	0.65
Z0/10	-	-	-	-	-	-	-	-	-	-	N/A
Z0/11	-	-	-	1.6	-	-	-	-	-	0.9	0.65
Z0/12	-	-	-	-	-	-	-	-	-	-	N/A
Z0/13	0.5	-	-	-	-	-	-	-	-	-	N/A
Z0/14	-	-	-	-	-	-	-	-	-	-	N/A
Z0/15	-	-	-	-	-	-	-	-	-	-	N/A
Z0/16	-	-	-	-	-	-	-	-	-	-	N/A
Z0/17	-	-	-	-	-	-	-	-	-	-	N/A
Z0/18	0.5	-	-	-	-	-	-	-	-	-	N/A
Z0/19	-	-	-	-	-	-	-	-	-	-	N/A
Z0/20	0.5	-	-	-	-	-	-	-	-	-	N/A
Z0/21	-	-	-	-	-	-	-	-	-	-	N/A
Z0/22	0.5	-	-	-	-	-	-	-	-	-	N/A
Z0/23	0.5	-	-	-	-	-	-	-	-	-	N/A
Z0/24	-	-	-	-	-	-	-	-	-	-	N/A
Z0/25	0.5	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
Standard value	60	60	22	
Z0/08	140	-	-	63

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
Z0/09	143	-	-	4
Z0/01	116	-	-	166
Z0/02	116	-	-	167
Z0/03	116	-	-	176
Z0/04	-	83	-	23
Z0/05	116	-	-	178
Z0/06	116	-	-	333
Z0/07	116	-	-	167
Z0/10	116	-	-	111
Z0/11	116	-	-	75
Z0/12	116	-	-	112
Z0/13	-	83	-	33
Z0/14	106	-	-	6
Z0/15	116	-	-	105
Z0/16	-	81	60	88
Z0/17	116	-	-	105
Z0/18	-	83	-	50
Z0/19	116	-	-	114
Z0/20	-	83	-	50
Z0/21	116	-	-	113
Z0/22	-	83	-	50
Z0/23	115	-	-	114
Z0/24	-	115	-	490
Z0/25	-	83	-	196

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Z0/01	NO (-43.8%)	NO
Z0/02	NO (-0.7%)	NO
Z0/03	NO (-2%)	NO
Z0/05	NO (-43.4%)	NO
Z0/06	NO (-0.6%)	NO
Z0/07	NO (-40.5%)	NO
Z0/10	NO (-8.9%)	NO
Z0/11	N/A	N/A
Z0/12	NO (-0.1%)	NO
Z0/15	NO (-7.9%)	NO
Z0/16	NO (-0.1%)	NO
Z0/17	NO (-3.1%)	NO
Z0/19	NO (-11.9%)	NO
Z0/21	NO (-11.9%)	NO
Z0/23	NO (-11.9%)	NO

Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of 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
Area [m^2]	891.5	891.5
External area [m^2]	2393.5	2393.5
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	3	3
Average conductance [W/K]	626.87	780.51
Average U-value [W/m^2K]	0.26	0.33
Alpha value* [%]	25.6	13.95

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

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
100	**D1 Non-residential Institutions: Education**
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 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	10.1	15.6
Cooling	0	0
Auxiliary	6.78	3.19
Lighting	9.39	11.72
Hot water	5.38	5.77
Equipment*	20.12	20.12
TOTAL**	**31.66**	**36.28**

* 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	9.38	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	121.24	119.72
Primary energy* [kWh/m^2]	76.86	70.01
Total emissions [kg/m^2]	8.2	12.8

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

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] No Heating or Cooling										
	Actual	44.2	0	0	0	0	0	0	0	0
	Notional	39.8	0.2	0	0	0	0	0	----	----
[ST] Central heating using water: floor heating, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	34.9	88.6	10.4	0	7	0.93	0	0.99	0
	Notional	47.3	74.7	16	0	3.3	0.82	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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.18	Z0/01/w
Floor	0.2	0.06	Z0/24/f
Roof	0.15	0.13	Z0/01/c
Windows, roof windows, and rooflights	1.5	1.1	Z0/10/s/cw
Personnel doors	1.5	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]

* There might be more than one surface where the minimum U-value occurs.

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	3