BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

No 18 Park Square East - Be Green

As designed

Date: Fri May 15 07:44:25 2020

Administrative information

Building Details

Address: 18 Park Square East, London,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.12

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.12

BRUKL compliance check version: v5.6.a.1

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name: Cundall

Telephone number: +442074381600

Address: One Carter Lane, London, EC4V 5ER

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	19.4
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	19.4
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	15.7
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	0.2	0.22	RM000008:Surf[2]
Floor	0.25	0.2	0.58	BC000003:Surf[3]
Roof	0.25	0.14	0.14	RM000008:Surf[0]
Windows***, roof windows, and rooflights	2.2	1.33	1.4	F3000000:Surf[0]
Personnel doors	2.2	-	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building

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

* 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- Be Green VRF FCUs - AHU (Reception, Atrium and Meeting Rms)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3	4.5	0	1.6	0.75
Standard value	2.5*	3.2	N/A	1.6^	0.65
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. For types <=12 kW output, refer to EN 14825 for limiting standards.

^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

2- Be Green Electric Heaters - MVHR (Basement chg rms and showers)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0.2	0	0.75
Standard value	N/A	N/A	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

3- Be Green VRF CAM-V system - AHU (Open Plan Offices)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3	4.5	0	0	0.75
Standard value	2.5*	3.2	N/A	N/A	0.65
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. For types <=12 kW output, refer to EN 14825 for limiting standards.

"No HWS in project, or hot water is provided by HVAC system"

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
F3 - Atrium	-	-	-	-	-	-	-	0.3	-	-	N/A
F3 - Atrium	-	-	-	-	-	-	-	0.3	-	-	N/A
B - Circulation	-	-	-	1.6	-	-	-	-	-	-	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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
B - Shower	-	-	-	1.6	-	-	-	-	-	-	N/A
B - Toilets	-	-	-	1.6	-	-	-	-	-	-	N/A
B - Female Changing Rms	-	-	-	1.6	-	-	-	-	-	-	N/A
B - Shower	-	-	-	1.6	-	-	-	-	-	-	N/A
B - Acc WC	-	-	-	1.6	-	-	-	-	-	-	N/A
B - Shower	-	-	-	1.6	-	-	-	-	-	-	N/A
B - Shower	-	-	-	1.6	-	-	-	-	-	-	N/A
B - Toilets	-	-	-	1.6	-	-	-	-	-	-	N/A
B - Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
B - Male Changing Room	-	-	-	1.6	-	-	-	-	-	-	N/A
F3 - Meeting Room	-	-	-	-	-	-	-	0.3	-	-	N/A
F3 - Toilets	-	-	-	1.6	-	-	-	-	-	-	N/A
F3 - Staircase	-	-	-	1.6	-	-	-	-	-	-	N/A
F3 - Open Plan Office	-	-	-	1.6	-	-	-	-	-	-	N/A
F3 - Open Plan Office Per	-	-	-	1.6	-	-	-	-	-	-	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	
B - UKPN	80	-	-	113
F3 - Atrium	-	80	-	49
F3 - Atrium	-	80	-	92
B - Circulation	-	80	-	50
B - Shower	-	80	-	26
B - Toilets	-	80	-	52
B - Female Changing Rms	-	80	-	27
B - Shower	-	80	-	23
B - Acc WC	-	80	-	58
B - Plant	80	-	-	172
B - Shower	-	80	-	16
B - Shower	-	80	-	24
B - Toilets	-	80	-	54
B - Plant	80	-	-	54
B - LV switchroom	80	-	-	145
B - Comms Room	80	-	-	41
B - Circulation	-	80	-	87
B - Male Changing Room	-	80	-	41
F3 - Meeting Room	120	-	-	334
F3 - Toilets	-	80	-	93
F3 - Staircase	-	80	-	43
F3 - Open Plan Office	120	-	-	1063
F3 - Open Plan Office Per	120	-	-	1258

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?
F3 - Atrium	YES (+53.6%)	NO
F3 - Atrium	YES (+279.2%)	NO
F3 - Meeting Room	NO (-86%)	NO
F3 - Toilets	N/A	N/A
F3 - Staircase	N/A	N/A
F3 - Open Plan Office	NO (-68.7%)	NO
F3 - Open Plan Office Per	NO (-36.3%)	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?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m^2]	804.8	804.8
External area [m^2]	1606.2	1606.2
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	3	3
Average conductance [W/K]	465.58	553.8
Average U-value [W/m^2K]	0.29	0.34
Alpha value* [%]	12.42	10

* 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
100	**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
	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	3.77	4.75
Cooling	5.21	5.12
Auxiliary	7.48	3.18
Lighting	8.7	17.17
Hot water	5.89	8.85
Equipment*	56.23	56.23
TOTAL**	**31.05**	**39.09**

* 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
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]	99.48	102.7
Primary energy* [kWh/m^2]	119.52	148.94
Total emissions [kg/m^2]	15.7	19.4

* 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] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	38.1	155	3.5	12	16.8	3	3.58	3	4.5
	Notional	17.8	75.8	1.9	5.6	10.7	2.56	3.79	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	42.4	67.1	3.9	5.5	6	3	3.36	3	4.5
	Notional	38.9	93.3	4.2	6.8	2.1	2.56	3.79	----	----
[ST] Central heating using water: radiators, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	27.8	0	7.7	0	7.6	1	0	1	0
	Notional	55.3	0	17.8	0	3.3	0.86	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

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	0.14	RM000003:Surf[1]
Floor	0.2	0.18	RM000008:Surf[1]
Roof	0.15	0.14	RM000008:Surf[0]
Windows, roof windows, and rooflights	1.5	1.1	F300000B:Surf[0]
Personnel doors	1.5	-	No Personnel doors in building
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building

$U_{i\text{-}Typ}$ = 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