BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

No 18 Park Square East - Be Lean_New

As designed

Date: Fri May 15 08:18:41 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, $kgCO_2/m^2.annum$	24.5
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	24.5
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	22.7
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- New Be Lean FCUs - AHU

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	4.5	0	1.6	0.75
Standard value	0.91*	3.9	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 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.

^ 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- New Be Lean Electric Heaters - MVHR (Basement chg rms and showers)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	0.2	0	0.75
Standard value	0.91*	N/A	N/A	N/A	0.5
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.

"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
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

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 - Circulation	-	-	-	1.6	-	-	-	-	-	-	N/A
B - Male Changing Room	-	-	-	1.6	-	-	-	-	-	-	N/A
F3 - Meeting Room	-	-	-	-	-	-	-	0.3	-	-	N/A
F3 - Toilets	-	-	-	-	-	-	-	0.3	-	-	N/A
F3 - Staircase	-	-	-	-	-	-	-	0.3	-	-	N/A
F3 - Open Plan Office	-	-	-	-	-	-	-	0.3	-	-	N/A
F3 - Open Plan Office Per	-	-	-	-	-	-	-	0.3	-	-	N/A

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
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?	NO

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	11.65	10.57
Cooling	4.99	5.12
Auxiliary	12.55	10.33
Lighting	8.7	17.17
Hot water	31.98	26.27
Equipment*	56.23	56.23
TOTAL**	**69.88**	**69.46**

* 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]	131.79	142.59
Total emissions [kg/m^2]	22.7	24.5

* 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] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	41.6	83	13.9	6.4	14.6	0.83	3.58	0.91	4.5
	Notional	35.1	90.1	11.3	6.6	12.9	0.86	3.79	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	27.8	0	9	0	7.6	0.85	0	0.91	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