BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Northern Studios THFC

As designed

Date: Thu Sep 17 11:10:23 2020

Administrative information

Building Details

Address: Address 1, London, N170BX

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: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	21.4
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	21.4
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	11.7
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	0.18	0.18	L0000000:Surf[3]
Floor	0.25	0.15	0.15	L0000000:Surf[0]
Roof	0.25	0.13	0.13	L0000003:Surf[1]
Windows***, roof windows, and rooflights	2.2	1.12	1.28	L1000003:Surf[8]
Personnel doors	2.2	2.2	2.2	L0000000:Surf[1]
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- MVHR + FCU +DEN

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	1	6.74	0	1.6	0.8
Standard value	N/A	3.2	N/A	1.6^	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

^ 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- Nat Vent + Radiator DEN

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	1	-	0	0	-
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					YES

3- Extract Only + Radiator DEN

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	1	-	0	0	-
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					YES

1- DHW Elec

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	1	-
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**
L0 - Room 37	-	-	-	-	-	-	-	0.5	-	-	N/A
L0 - Room 36	-	-	-	-	-	-	-	0.5	-	-	N/A
L0 - Room 38	-	-	0.4	-	-	-	-	-	-	-	N/A
L0 - Room near 36	-	-	-	-	-	-	-	0.5	-	-	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
L1 - Room 6 (Toilet 2)	-	-	0.4	-	-	-	-	-	-	-	N/A
L1 - Room 7	-	-	-	-	-	-	-	0.5	-	-	N/A
L1 - Toilet 3	-	-	0.4	-	-	-	-	-	-	-	N/A
L2 - Toilet 2	-	-	0.4	-	-	-	-	-	-	-	N/A
L2 - Toilet2 corridor	-	-	0.4	-	-	-	-	-	-	-	N/A
L2 - Toilet 3	-	-	0.4	-	-	-	-	-	-	-	N/A
L1 - Empty Space 1 (Near Room 7)	-	-	-	-	-	-	-	0.5	-	-	N/A
L1 - Empty Space 2	-	-	-	-	-	-	-	0.5	-	-	N/A
L2 - Empty Space 3	-	-	-	-	-	-	-	0.5	-	-	N/A
L2 - Empty Space 4	-	-	-	-	-	-	-	0.5	-	-	N/A
L0- Room 32	-	-	-	-	-	-	-	0.5	-	-	N/A
L0 - Room 34 (Toilet)	-	-	0.4	-	-	-	-	-	-	-	N/A
L1 - Room 42	-	-	-	-	-	-	-	0.5	-	-	N/A
L1 - Toilet (Room 42)	-	-	0.4	-	-	-	-	-	-	-	N/A
L0 - Empty Room near 34	-	-	-	-	-	-	-	0.5	-	-	N/A
L0 - Room 34	-	-	-	-	-	-	-	0.5	-	-	N/A
L2 - Empty Space 2	-	-	-	-	-	-	-	0.5	-	-	N/A
L2 - Toilet 1	-	-	0.4	-	-	-	-	-	-	-	N/A
L3 - Toilet 2	-	-	0.4	-	-	-	-	-	-	-	N/A
L3 - Empty Space 1	-	-	-	-	-	-	-	0.5	-	-	N/A
L3 -Toilet 1	-	-	0.4	-	-	-	-	-	-	-	N/A
L2 - Empty space 1	-	-	-	-	-	-	-	0.5	-	-	N/A
L0 - Room 31	-	-	1	-	-	-	-	-	1	-	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	
L0 - Room Behind Cycle stand	100	-	-	259
L0 - Room Behind Cycle stand 2	100	-	-	42
L0 - Room 37	100	-	-	216
L0 - stair Behind Room 37	-	100	-	44
L0 - Room 36	100	-	-	367
L0 - Room 38	-	100	15	874
L0 - Room near 36	100	-	-	285
L0 - Stair near Room 36	-	100	-	60
L1 - Stair Behind Room 7	-	100	-	42
L1 - Room 6 (Toilet 2)	-	100	-	146
L1 - Room 7	100	-	-	323
L1 - Toilet 3	-	100	-	128
L2 - Stair2	-	100	-	42
L2 - Toilet 2	-	100	-	146
L2 - Toilet2 corridor	-	100	-	161
L2 - Toilet 3	-	100	-	128

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
L1 - Empty Space 1 (Near Room 7)	100	-	-	1923
L1 - Empty Space 2	100	-	-	869
L2 - Empty Space 3	100	-	-	1923
L2 - Empty Space 4	100	-	-	869
L0- Room 32	100	-	-	755
L0 - Room 34 (Toilet)	-	100	-	136
L1 - Room 42	100	-	-	1643
L1 - Stair Near Room 42)	-	100	-	56
L1 - Toilet (Room 42)	-	100	-	101
L0 - Empty Room near 34	100	-	-	285
L0 - Room 34	100	-	-	209
L2 - Empty Space 2	100	-	-	475
L2 - |Stair 1	-	100	-	42
L2 - Toilet 1	-	100	-	95
L3 -Stair	-	100	-	33
L3 - Toilet 2	-	100	-	103
L3 - Empty Space 1	100	-	-	2601
L3 -Toilet 1	-	100	-	81
L2 - Empty space 1	100	-	-	1069
L0 - Room 31	-	100	-	240

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?
L0 - Room Behind Cycle stand	N/A	N/A
L0 - Room Behind Cycle stand 2	N/A	N/A
L0 - Room 37	N/A	N/A
L0 - Room 36	NO (-26.2%)	NO
L0 - Room 38	NO (-0.7%)	NO
L0 - Room near 36	NO (-85.5%)	NO
L1 - Room 7	N/A	N/A
L1 - Empty Space 1 (Near Room 7)	NO (-32.9%)	NO
L1 - Empty Space 2	NO (-68.8%)	NO
L2 - Empty Space 3	NO (-46.4%)	NO
L2 - Empty Space 4	NO (-70.6%)	NO
L0- Room 32	NO (-30.4%)	NO
L1 - Room 42	NO (-43.9%)	NO
L0 - Empty Room near 34	NO (-66.1%)	NO
L0 - Room 34	N/A	N/A
L2 - Empty Space 2	NO (-65.1%)	NO
L3 - Empty Space 1	NO (-79.2%)	NO
L2 - Empty space 1	NO (-50.2%)	NO
L0 - Room 31	NO (-27%)	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?	YES
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]	2917.7	2917.7
External area [m^2]	4167.6	4167.6
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	3	3
Average conductance [W/K]	1144.92	2088.85
Average U-value [W/m^2K]	0.27	0.5
Alpha value* [%]	10.02	10

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

Building Use

% Area	Building Type
3	**A1/A2 Retail/Financial and Professional services**
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
97	**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	7.02	14.57
Cooling	4.68	5.45
Auxiliary	16.9	12.22
Lighting	10.39	17.62
Hot water	4.55	1.6
Equipment*	37.14	37.14
TOTAL**	**43.54**	**51.46**

* 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	14.24	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]	112.24	126.74
Primary energy* [kWh/m^2]	129.97	127.59
Total emissions [kg/m^2]	11.7	21.4

* 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] District heating, [HFT] District Heating, [CFT] Electricity										
	Actual	16.4	117.8	5.1	6.2	20.2	0.9	5.29	1	6.74
	Notional	42.3	98.3	11.7	7.2	14.7	1	3.79	----	----
[ST] Central heating using water: radiators, [HS] District heating, [HFT] District Heating, [CFT] Electricity										
	Actual	21.9	0	6.5	0	2.8	0.94	0	1	0
	Notional	76	0	21.1	0	2.6	1	0	----	----
[ST] Central heating using water: radiators, [HS] District heating, [HFT] District Heating, [CFT] Electricity										
	Actual	69.2	0	20.5	0	11	0.94	0	1	0
	Notional	100.2	0	27.8	0	6.8	1	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	0.18	L0000000:Surf[3]
Floor	0.2	0.15	L0000000:Surf[0]
Roof	0.15	0.13	L0000003:Surf[1]
Windows, roof windows, and rooflights	1.5	1.12	L0000009:Surf[4]
Personnel doors	1.5	2.2	L0000000:Surf[1]
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