BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Sport Hall Harris Tottenham Academy

As built

Date: Wed Oct 14 09:38:08 2015

Administrative information

Building Details

Address: Harris Tottenham Academy, Ashley Road, London, N17 9LN

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.2.d.2

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.2

BRUKL compliance check version: v5.2.d.2

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name:

Telephone number:

Address: , ,

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	86.8
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	86.8
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	67
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 the building services should achieve reasonable overall standards of energy efficiency

Values not achieving 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	0.55	S3000000_W3_2_2
Floor	0.25	0.14	0.21	S1000001_F_-1
Roof	0.25	0.17	0.19	S3000000_C_0_0
Windows***, roof windows, and rooflights	2.2	1.7	1.7	S1000000_W1-W1
Personnel doors	2.2	1.8	1.8	S1000000_W1-W0
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 [$W/(m^2K)$]
$U_{a\text{-}Calc}$ = 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	5

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- Main system

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.95	-	-	-	-
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- SYST0000-DHW

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	0.97	0
Standard value	0.8	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**
S17 Activity Hall	-	-	-	1.1	-	-	-	-	-	0.7	0.65
S3 Sport Hall	-	-	-	1.1	-	-	-	-	-	0.7	0.65
S15 Office	-	-	-	1.1	-	-	-	-	-	0.7	0.65
S10 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
S11 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
S6 Wheelchair Shower/WC and Staff WC	-	-	0.5	-	-	-	-	-	-	-	N/A
S9 Staff Changing	-	-	-	-	-	-	-	-	-	-	N/A
S34 Switchroom	-	-	-	-	-	-	-	-	-	-	N/A
S2 Staff Changing	-	-	-	1.1	-	-	-	-	-	0.7	0.65
S14 Changing room 4	-	-	-	1.1	-	-	-	-	-	0.7	0.65
circulation	-	-	-	-	-	-	-	-	-	-	N/A
S12 Changing room 3	-	-	-	1.1	-	-	-	-	-	0.7	0.65
S4 Changing room 2	-	-	-	1.1	-	-	-	-	-	0.7	0.65
circulation	-	-	-	-	-	-	-	-	-	-	N/A
S1 Changing Room 1	-	-	-	1.1	-	-	-	-	-	0.7	0.65

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
S13 Corridor	-	-	-	-	-	-	-	-	-	-	N/A
S5 Corridor	-	-	-	-	-	-	-	-	-	-	N/A
S21 Plantroom	-	-	-	-	-	-	-	-	-	-	N/A
S19 PE Classroom	-	-	-	1.8	-	-	-	-	-	0.7	0.65
Circulation stairs	-	-	-	-	-	-	-	-	-	-	N/A
S20 Corridor	-	-	-	-	-	-	-	-	-	-	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	
S17 Activity Hall	-	75	-	771
S3 Sport Hall	-	75	-	3613
S15 Office	75	-	-	204
S10 WC	-	75	-	91
S11 WC	-	75	-	93
S6 Wheelchair Shower/WC and Staff WC	-	75	-	75
S9 Staff Changing	-	75	-	45
S34 Switchroom	-	75	-	47
S2 Staff Changing	-	75	-	46
S14 Changing room 4	-	75	-	90
circulation	-	75	-	23
S12 Changing room 3	-	75	-	90
S4 Changing room 2	-	75	-	90
circulation	-	75	-	24
S1 Changing Room 1	-	75	-	89
S13 Corridor	-	75	-	121
S5 Corridor	-	75	-	124
S21 Plantroom	-	75	-	144
S19 PE Classroom	75	-	-	414
Circulation stairs	-	75	-	80
S20 Corridor	-	75	-	93

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?
S17 Activity Hall	NO (-42%)	YES
S3 Sport Hall	N/A	N/A
S15 Office	N/A	N/A
S19 PE Classroom	NO (-88.4%)	YES

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]	1262.2	1262.2
External area [m^2]	3488.9	3488.9
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	5	5
Average conductance [W/K]	711.95	968.84
Average U-value [W/m^{2}K]	0.2	0.28
Alpha value* [%]	11.53	17.72

* 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 Inst.: Hospitals and Care Homes
	C2 Residential Inst.: Residential schools
	C2 Residential Inst.: Universities and colleges
	C2A Secure Residential Inst.
	Residential spaces
	D1 Non-residential Inst.: Community/Day Centre
	D1 Non-residential Inst.: Libraries, Museums, and Galleries
100	**D1 Non-residential Inst.: Education**
	D1 Non-residential Inst.: Primary Health Care Building
	D1 Non-residential Inst.: 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	18.36	18.38
Cooling	0	0
Auxiliary	6.33	2.78
Lighting	14.78	18.02
Hot water	301.07	334.65
Equipment*	11.71	11.71
TOTAL**	**340.54**	**373.82**

* Energy used by equipment does not count towards the total for 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	24.41	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]	79.35	102.49
Primary energy* [kWh/m^2]	452.88	492.95
Total emissions [kg/m^2]	67	86.8

* 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] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	59	20.4	18.4	0	5.8	0.89	0	0.95	0
	Notional	55	47.5	18.4	0	2.8	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 BCO can give particular attention to items with specifications that 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	S1000000_W1_-1
Floor	0.2	0.06	S5000000_F_-1
Roof	0.15	0.15	S1000000_C_-1
Windows, roof windows, and rooflights	1.5	1.7	S1000000_W1-W1
Personnel doors	1.5	1.8	S1000000_W1-W0
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	5