BRUKL Output Document

HM Government

Compliance with England and Wales Building Regulations Part L 2010

Project name

Sports Hall, The Royal School

As built

Date: Wed Jul 24 11:41:42 2013

Administrative information

Building Details

Address: 65 Rosslyn Hill, Hampstead, Camden, , NW3 5UD

Certification tool

Calculation engine: SBEM

Calculation engine version: v4.1.d.0

Interface to calculation engine: Design Database

Interface to calculation engine version: v25.05

BRUKL compliance check version: v4.1.d.0

Owner Details

Name: Cognita

Telephone number: 01908 396 250

Address: 5 & 7 Opal Drive, Eastlake Park, MK15 0DU

Certifier details

Name: Jonathan Richard Associates

Telephone number: 0121 236 6532

Address: 36-37 George Street, BIRMINGHAM, B3 1QA

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

1.1	CO_2 emission rate from the notional building, kgCO_2/m².annum	9.3
1.2	Target CO_2 emission rate (TER), kgCO_2/m².annum	9.3
1.3	Building CO_2 emission rate (BER), kgCO_2/m².annum	9
1.4	Are emissions from the building less than or equal to the target?	BER =< TER
1.5	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

2.a Building fabric

Element	$U_{a-Limit}$	U_{a-Calc}	U_{i-Calc}	Surface where the maximum value occurs*
Wall**	0.35	0.25	0.25	W/C Wall 1
Floor	0.25	0.2	0.2	D/WC Exposed Floor 1
Roof	0.25	0.15	0.15	HALL Exposed Roof 1
Windows***, roof windows, and rooflights	2.2	1.5	1.5	HALL Window 2 (1)
Personnel doors	2.2	-	-	"No heat loss personnel doors"
Vehicle access & similar large doors	1.5	-	-	"No heat loss vehicle access doors"
High usage entrance doors	3.5	-	-	"No heat loss high usage entrance doors"

$U_{a-Limit}$ = Limiting area-weighted average U-values [W/(m²K)]
U_{a-Calc} = Calculated area-weighted average U-values [W/(m²K)]
U_{i-Calc} = Calculated maximum individual element U-values [W/(m²K)]

* 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
m³/(h.m²) at 50 Pa	10	5

2.b Building services

The building services parameters listed below are expected to be checked by the BCO against guidance. No automatic checking is performed by the tool.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Toilets - UFH, Extract

Heating seasonal efficiency	Cooling nominal efficiency	SFP [W/(l/s)]	HR seasonal efficiency	
0.92	-	-	-	
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system				YES

2- Hall - LTHW UFH

Heating seasonal efficiency	Cooling nominal efficiency	SFP [W/(l/s)]	HR seasonal efficiency	
0.92	-	-	-	
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system				YES

3- Circulation - Radiators

Heating seasonal efficiency	Cooling nominal efficiency	SFP [W/(l/s)]	HR seasonal efficiency	
0.92	-	-	-	
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system				YES

1- U/Sink Electric

Heating seasonal efficiency	Hot water storage loss factor [kWh/litre per day]
1	-

Local mechanical ventilation and exhaust

Zone	Supply/extract SFP [W/(l/s)]	HR seasonal efficiency	Exhaust SFP [W/(l/s)]
D/WC	-	-	0.33
W/C	-	-	0.33

General lighting and display lighting

Zone	General lighting [W]	Display lamps efficacy [lm/W]
D/WC	10	-
W/C	10	-
HALL	2360	-
PLANT	10	-
STORE	100	-
STAIRS	60	-

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
HALL	NO (-83.8%)	NO

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

Separate submission

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

Separate submission

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	490.7	490.7
External area [m²]	1756.5	1756.5
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	5	5
Average conductance [W/K]	382.94	554.24
Average U-value [W/m²K]	0.22	0.32
Alpha value* [%]	15.31	33.13

* 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: Telephone exchanges
	Others: Miscellaneous 24hr activities
	Others: Car Parks 24 hrs
	Others - Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	13.94	25.5
Cooling	0	0
Auxiliary	2.31	0.2
Lighting	9.71	8.11
Hot water	0	0
Equipment*	9.91	9.66
TOTAL	**25.96**	**33.82**

* Energy used by equipment does not count towards the total for calculating emissions.

Energy Production by Technology [kWh/m²]

	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	Indicative Target
Heating + cooling demand [MJ/m²]	75.97	130.6
Total consumption [kWh/m²]	25.96	33.82
Total emissions [kg/m²]	9	9.3

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: floor heating, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	99.3	15.7	31.9	0	9.4	0.86	0	0.92	0
Notional	136.9	236.8	48	0	13.5	0.79 / 0.81	0	----	----
[ST] Central heating using water: floor heating, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	44.3	33.6	14.2	0	2.4	0.86	0	0.92	0
Notional	82.2	49.4	26.6	0	0	0.79 / 0.81	0	----	----
[ST] No Heating or Cooling									
Actual	0	2.8	0	0	0	0	0	0	0
Notional	0	1.7	0	0	0	0	0	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity									
Actual	92.4	76.4	29.7	0	2.5	0.86	0	0.92	0
Notional	131	161.7	45.9	0	1.2	0.79 / 0.81	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	0.25	W/C Wall 1
Floor	0.2	0.2	D/WC Exposed Floor 1
Roof	0.15	0.15	HALL Exposed Roof 1
Windows, roof windows, and rooflights	1.5	1.5	HALL Window 2 (1)
Personnel doors	1.5	-	"No heat loss personnel doors"
Vehicle access & similar large doors	1.5	-	"No heat loss vehicle access doors"
High usage entrance doors	1.5	-	"No heat loss high usage entrance doors"
U$_{i\text{-Typ}}$ = Typical individual element U-values [W/(m^{2}K)]		U$_{i\text{-Min}}$ = Minimum individual element U-values [W/(m^{2}K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m^3/(h.m^2) at 50 Pa	5	5

Thermal bridges

There is at least one junction in the project whose linear thermal transmittance has been defined as having been calculated following a quality-assured accredited construction details approach in accordance with a scheme approved by the Secretary of State.