

Project name

_Ruslip High School

As designed

Date: Wed Jul 19 15:35:10 2017

Administrative information

Building Details

Address: Address 1, Address 2, City, Postcode

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.2.g.3

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.5

BRUKL compliance check version: v5.2.g.3

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 CO₂ emission rate for the building should not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	17.3
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	17.3
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	14.9
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 -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.29	1.79	6T000000_W4_0_0
Floor	0.25	0.21	0.28	PL000001_F_1_1
Roof	0.25	0.23	0.61	SX000000_C_1_1
Windows***, roof windows, and rooflights	2.2	1.6	1.6	TH000000_W3-W0
Personnel doors	2.2	-	-	"No external personnel doors"
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 -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)] * 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	5.21

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	0.91	-	-	-	-
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.					

2- Class Rooms and General Areas

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	-	-
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.					

3- WCs

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	-	-
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	Hot water provided by HVAC system	-
Standard value	N/A	N/A

2- SYST0003-DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	-
Standard value	N/A	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	
Plant(2)	-	-	-	-	-	-	-	-	-	-	N/A	
Therapy/Seminar	-	-	-	-	-	-	-	-	-	-	N/A	
Therapy/Seminar	-	-	-	-	-	-	-	-	-	-	N/A	
Therapy/Seminar	-	-	-	-	-	-	-	-	-	-	N/A	
Therapy/Seminar	-	-	-	-	-	-	-	-	-	-	N/A	
6th form off	-	-	-	-	-	-	-	-	-	-	N/A	
SRP Off	-	-	-	-	-	-	-	-	-	-	N/A	
Media Classroom	-	-	-	-	-	-	-	-	-	-	N/A	
Main Hall	-	-	-	-	-	-	-	-	-	-	N/A	
Classroom	-	-	-	-	-	-	-	-	-	-	N/A	
Classroom	-	-	-	-	-	-	-	-	-	-	N/A	
Staff Room	-	-	-	-	-	-	-	-	-	-	N/A	
Classroom	-	-	-	-	-	-	-	-	-	-	N/A	
Sixth Form Study Space	-	-	-	-	-	-	-	-	-	-	N/A	
Staff Workroom	-	-	-	-	-	-	-	-	-	-	N/A	
Art Studio	-	-	-	-	-	-	-	-	-	-	N/A	
Toilets	0.4	-	-	-	-	-	-	-	-	-	N/A	
Accessible Toilets	0.4	-	-	-	-	-	-	-	-	-	N/A	
Accessible WCs	0.4	-	-	-	-	-	-	-	-	-	N/A	
Hygiene Room	0.4	-	-	-	-	-	-	-	-	-	N/A	
Toilets	0.4	-	-	-	-	-	-	-	-	-	N/A	
Accessible Toilets	0.4	-	-	-	-	-	-	-	-	-	N/A	
Toilets	0.4	-	-	-	-	-	-	-	-	-	N/A	
Switch	-	-	-	-	-	-	-	-	-	-	N/A	

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
Plant(2)		83	-	-	114
Therapy/Seminar		93	-	-	131
Therapy/Seminar		93	-	-	121
Therapy/Seminar		93	-	-	48
Therapy/Seminar		93	-	-	95
6th form off		93	-	-	70
SRP Off		93	-	-	53
Media Classroom		93	-	-	189
Main Hall		93	-	-	1172
Classroom		93	-	-	367
Classroom		93	-	-	189
Staff Room		93	-	-	467
Classroom		93	-	-	194
Sixth Form Study Space		93	-	-	833
Staff Workroom		93	-	-	36

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Art Studio	93	-	-	629
Toilets	-	185	-	97
Accessible Toilets	-	185	-	10
Accessible WCs	-	185	-	22
Hygiene Room	-	185	-	28
Toilets	-	185	-	97
Accessible Toilets	-	185	-	10
Toilets	-	185	-	60
Switch	93	-	-	14

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?
Therapy/Seminar	NO (-88.9%)	NO
Therapy/Seminar	NO (-53.1%)	NO
Therapy/Seminar	N/A	N/A
Therapy/Seminar	N/A	N/A
6th form off	N/A	N/A
SRP Off	N/A	N/A
Media Classroom	NO (-71.7%)	NO
Main Hall	NO (-97.8%)	NO
Classroom	NO (-50.8%)	NO
Classroom	NO (-43.8%)	NO
Staff Room	NO (-54.2%)	NO
Classroom	NO (-53%)	NO
Sixth Form Study Space	NO (-38.7%)	NO
Staff Workroom	NO (-81.1%)	NO
Art Studio	NO (-75.1%)	NO
Hygiene Room	N/A	N/A

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?	NO
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]	1517.7	1517.7
External area [m ²]	4378.9	4378.9
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	5	3
Average conductance [W/K]	1291.5	1497.42
Average U-value [W/m ² K]	0.29	0.34
Alpha value* [%]	10.09	9.72

* 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

1 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

99 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/m²]

	Actual	Notional
Heating	42.49	35.96
Cooling	0	0
Auxiliary	1.5	0.9
Lighting	6.57	14.73
Hot water	7.59	7.59
Equipment*	25.58	25.58
TOTAL **	58.15	59.16

* 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/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	163.56	169.83
Primary energy* [kWh/m ²]	85.26	99.88
Total emissions [kg/m ²]	14.9	17.3

* 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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	0	0	0	0	0	0	0	0	0	0
Notional	0	0	0	0	0	0	0	----	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	127.4	34.9	41.4	0	1.4	0.86	0	0.91	0	0
Notional	104.8	67.4	35.6	0	0.7	0.82	0	----	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	205.6	26.3	66.8	0	2.9	0.86	0	0.91	0	0
Notional	153.2	55.5	52	0	2.9	0.82	0	----	----	----
[ST] No Heating or Cooling										
Actual	0	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 BCO can give particular attention to items with specifications that are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.02	TL000001_W13_0_0
Floor	0.2	0.05	MN000000_F_7_7
Roof	0.15	0.1	CC000002_C_0_0
Windows, roof windows, and rooflights	1.5	1.6	TH000000_W3-W0
Personnel doors	1.5	-	"No external personnel doors"
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-Typ} = Typical individual element U-values [W/(m²K)]		U _{i-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	5.21