BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Peter Symonds College Music School

As designed

Date: Tue Oct 24 15:48:39 2023

Administrative information

Building Details

Address: Owens Road, Winchester, SO22 6RX

Certifier details

Name: Ridge & Partners LLP

Telephone number: Phone

Address: 1 Royal Court, Kings Worthy, Winchester, SO23 7TW

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.22

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.22

BRUKL compliance module version: v6.1.e.1

Foundation area [m^2]: 616.06

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	4.3	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	3.54	
Target primary energy rate (TPER), kWh_{PE}/m^2.annum	45.59	
Building primary energy rate (BPER), kWh_{PE}/m^2.annum	37.1	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.15	0.15	GF000001:Surf[2]
Floors	0.18	0.13	0.13	GF000001:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.12	0.12	GF00000F:Surf[0]
Windows** and roof windows	1.6	1.3	1.3	GF000001:Surf[1]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors^	1.6	-	-	No personnel doors in building
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* 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. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	4

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	>0.95

1- VRF Heating & Cooling System

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	3.8	6	0	-	0.8
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

2- Electric Panel Heater System

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	1	-	0	-	0.8
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					NO

1- Domestic Hot Water

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	0.81	-
Standard value	1	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	**System type in the Approved Documents**
A	Local supply or extract ventilation units
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 balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter
NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.	

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	2.3	2	0.5	0.5	0.4	1	**Zone**	**Standard**
GF - Classrooms	-	-	-	1.7	-	-	-	-	-	-	N/A
GF - Office Spaces	-	-	-	1.7	-	-	-	-	-	-	N/A
GF - Band Rehersal	-	-	-	1.7	-	-	-	-	-	-	N/A
GF - Chamber	-	-	-	1.7	-	-	-	-	-	-	N/A
GF - Stores & WC	-	-	-	1.3	-	-	-	-	-	-	N/A
GF - Recital	-	-	-	1.4	-	-	-	-	-	-	N/A
FF - Classroom	-	-	-	1.7	-	-	-	-	-	-	N/A
FF - Chamber	-	-	-	1.7	-	-	-	-	-	-	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	2.3	2	0.5	0.5	0.4	1	Zone	Standard
FF - WCs	-	-	-	1.3	-	-	-	-	-	-	N/A
FF - Stores & WCs	-	-	-	1.3	-	-	-	-	-	-	N/A
FF - Tech & Control	-	-	-	1.4	-	-	-	-	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
GF - Classrooms	90	-	-
GF - Office Spaces	90	-	-
GF - Band Rehersal	90	-	-
GF - Chamber	90	-	-
GF - Plant Room	90	-	-
GF - Stores & WC	100	-	-
GF - Circulation & Lobbys	100	-	-
GF - Recital	90	-	-
FF - Classroom	90	-	-
FF - Chamber	90	-	-
FF - WCs	100	-	-
FF - Stores & WCs	100	-	-
FF - Tech & Control	90	-	-
FF - Server	90	-	-
FF - Circulation & Lobbys	100	-	-
FF - Elec Cupd	90	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
GF - Classrooms	NO (-25.7%)	NO
GF - Office Spaces	NO (-46.7%)	NO
GF - Band Rehersal	NO (-45.8%)	NO
GF - Chamber	NO (-73.4%)	NO
GF - Recital	NO (-30.2%)	NO
FF - Classroom	NO (-38.6%)	NO
FF - Chamber	NO (-88.2%)	NO
FF - Tech & Control	NO (-84.7%)	NO

Regulation 25A: Consideration of high efficiency 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
Floor area [m^2]	1240.7	1240.7
External area [m^2]	2408.8	2408.8
Weather	SOU	SOU
Infiltration [m^3/hm^2@ 50Pa]	4	3
Average conductance [W/K]	536.94	773.27
Average U-value [W/m^2K]	0.22	0.32
Alpha value* [%]	24.81	10

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
100	**Residential Institutions: Universities and Colleges**
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	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	5.02	10.53
Cooling	2.39	2.79
Auxiliary	8.31	1.94
Lighting	8.31	8.4
Hot water	20.95	12.72
Equipment*	25.48	25.48
TOTAL**	**44.97**	**36.38**

* 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	19.9	5.81
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*19.9*	*5.81*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	66.99	112.77
Primary energy [kWh_{PE}/m^2]	37.1	45.59
Total emissions [kg/m^2]	3.54	4.3

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] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	30.6	55	2.4	3.6	11.5	3.54	4.26	3.8	6
	Notional	39.1	69.5	3.9	4.2	2.3	2.78	4.63	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	31.9	0	11.1	0	2	0.8	0	1	0
	Notional	130.4	0	25.7	0	1.3	1.41	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