BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

R02 - Hi.HC.TW10 - Ham Community Centre BE LEAN

As designed

Date: Tue Aug 16 09:05:10 2022

Administrative information

Building Details

Address: DRAFT, -, -

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

BRUKL compliance check version: v5.6.b.0

Certifier details

Name: ENERGIST UK

Telephone number: -

Address: -, -, -

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	26.9
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	26.9
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	17.6
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	0.15	0.15	00000005:Surf[1]
Floor	0.25	0.12	0.12	00000005:Surf[0]
Roof	0.25	0.12	0.12	0100000A:Surf[1]
Windows***, roof windows, and rooflights	2.2	1.1	1.1	00000002:Surf[1]
Personnel doors	2.2	1.2	1.2	00000005:Surf[2]
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	<0.9

1- VRF System - Be Lean

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	3.5	0	0	0.8
Standard value	0.91*	2.6	N/A	N/A	0.5
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.

"No HWS in project, or hot water is provided by HVAC system"

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
00_Community Lounge	-	-	-	0.5	-	-	-	-	-	-	N/A
00_Community Lounge Circulation	-	-	-	0.5	-	-	-	-	-	-	N/A
00_Loft/Kitchen	-	-	-	0.5	-	-	-	-	-	-	N/A
00_Reception	-	-	-	0.5	-	-	-	-	-	-	N/A
01_Activity Hall	-	-	-	0.5	-	-	-	-	-	-	N/A
01_ICT Room	-	-	-	0.5	-	-	-	-	-	-	N/A
01_Meeting Room	-	-	-	0.5	-	-	-	-	-	-	N/A
01_Sensory Room	-	-	-	0.5	-	-	-	-	-	-	N/A
02_Art Room	-	-	-	0.5	-	-	-	-	-	-	N/A
02_Meeting Room	-	-	-	0.5	-	-	-	-	-	-	N/A
02_Musci Studio 2	-	-	-	0.5	-	-	-	-	-	-	N/A
02_Music Studio 1	-	-	-	0.5	-	-	-	-	-	-	N/A

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			
	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
00_Bike Store	100	-	-	12
00_Circulation/Stairwell	-	100	-	42

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
00_Community Lounge	-	100	-	92
00_Community Lounge Circulation	-	100	-	60
00_Loft/Kitchen	-	100	-	251
00_Plant	100	-	-	33
00_Plant	100	-	-	41
00_Reception	100	-	-	215
00_Toilet Block	-	100	-	105
01_Activity Hall	-	100	-	839
01_Changing WC	-	100	-	67
01_Circulation	-	100	-	59
01_Circulation/Stairwell	-	100	-	42
01_ICT Room	100	-	-	232
01_Meeting Room	100	-	-	100
01_Sensory Room	100	-	-	132
01_Storage	100	-	-	29
01_Storage	100	-	-	29
02_Art Room	100	-	-	206
02_Circulation	-	100	-	73
02_Circulation/Stairwell	-	100	-	40
02_Meeting Room	100	-	-	94
02_Musci Studio 2	100	-	-	92
02_Music Studio 1	100	-	-	211

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?
00_Bike Store	N/A	N/A
00_Circulation/Stairwell	NO (-98.4%)	NO
00_Community Lounge	NO (-43.1%)	NO
00_Community Lounge Circulation	YES (+56.3%)	NO
00_Loft/Kitchen	N/A	N/A
00_Plant	N/A	N/A
00_Plant	N/A	N/A
00_Reception	NO (-49.3%)	NO
00_Toilet Block	N/A	N/A
01_Activity Hall	NO (-81.6%)	NO
01_Changing WC	N/A	N/A
01_Circulation	NO (-95.5%)	NO
01_Circulation/Stairwell	N/A	N/A
01_ICT Room	NO (-63.2%)	NO
01_Meeting Room	NO (-78.9%)	NO
01_Sensory Room	NO (-18.3%)	NO
01_Storage	N/A	N/A
01_Storage	NO (-93.9%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
02_Art Room	NO (-60.7%)	NO
02_Circulation	NO (-33.5%)	NO
02_Circulation/Stairwell	YES (+3.3%)	NO
02_Meeting Room	NO (-58.1%)	NO
02_Musci Studio 2	N/A	N/A
02_Music Studio 1	NO (-84.5%)	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?	NO
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]	679.9	679.9
External area [m^2]	1463.9	1463.9
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	3	3
Average conductance [W/K]	296.33	693.68
Average U-value [W/m^2K]	0.2	0.47
Alpha value* [%]	10	10

* 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 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
100	**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	18.37	38.99
Cooling	6.77	8.77
Auxiliary	2.44	3.4
Lighting	11.55	18.66
Hot water	13.2	13.2
Equipment*	37.34	37.34
TOTAL**	**52.33**	**83.03**

* 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	0	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]	131.9	240.73
Primary energy* [kWh/m^2]	102.26	155.99
Total emissions [kg/m^2]	17.6	26.9

* 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] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	59	72.9	18.4	6.8	2.4	0.89	2.99	0.91	4
	Notional	121	119.7	39	8.8	3.4	0.86	3.79	----	----

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	0.15	00000005:Surf[1]
Floor	0.2	0.12	00000005:Surf[0]
Roof	0.15	0.12	0100000A:Surf[1]
Windows, roof windows, and rooflights	1.5	1.1	00000002:Surf[1]
Personnel doors	1.5	1.2	00000005:Surf[2]
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