BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name **Shell and Core**

As designed

Date: Mon Sep 07 17:37:14 2020

Administrative information

Building Details

Address:

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.12

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.12

BRUKL compliance check version: v5.6.a.1

Owner Details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certifier details

Name: Method Consulting

Telephone number: Phone

Address: Berkeley House, Hunts Rise, South Marston, Swindon, SN3 4 TG

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	46.2
Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	46.2
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	40.5
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	W0000000:Surf[1]
Floor	0.25	0.15	0.15	W0000000:Surf[0]
Roof	0.25	-	-	UNKNOWN
Windows***, roof windows, and rooflights	2.2	1.6	1.6	W0000000:Surf[2]
Personnel doors	2.2	2.2	2.2	W0000000:Surf[10]
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/(m²K)]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [W/(m²K)]
$U_{i\text{-}Calc}$ = 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
$m^3/(h.m^2)$ 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	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- ASHP MVHR (Commercial Units)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	3.2	0	0	0.88
Standard value	0.91*	3.2	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.

1- DHW (Commercial Units)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.005
Standard value	1	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
W00 - Commercial 1 - Office	-	-	-	1.1	-	-	-	-	-	-	N/A
W00 - Commercial 3 - Retail	-	-	-	1.1	-	-	-	-	-	-	N/A
W00 - Commercial 5 - Retail	-	-	-	1.1	-	-	-	-	-	-	N/A
W00 - Commercial 6 - Office	-	-	-	1.1	-	-	-	-	-	-	N/A
W00 - Commercial 2 - Cafe	-	-	-	1.1	-	-	-	-	-	-	N/A
W00 - Commercial 2 - Cafe Kitchen	-	-	-	1.1	-	-	-	-	-	-	N/A
W00 - Commercial 4 - Cafe	-	-	-	1.1	-	-	-	-	-	-	N/A
W00 - Commercial 4 - Cafe Kitchen	-	-	-	1.1	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
W00 - Commercial 1 - Office	NO
W00 - Commercial 3 - Retail	NO
W00 - Commercial 5 - Retail	NO
W00 - Commercial 6 - Office	NO
W00 - Commercial 2 - Cafe	NO
W00 - Commercial 2 - Cafe Kitchen	NO

Shell and core configuration

Zone	Assumed shell?
W00 - Commercial 4 - Cafe	NO
W00 - Commercial 4 - Cafe Kitchen	NO

General lighting and display lighting

	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
W00 - Commercial 1 - Office	100	-	-	759
W00 - Commercial 3 - Retail	-	100	100	1504
W00 - Commercial 5 - Retail	-	100	100	2379
W00 - Commercial 6 - Office	100	-	-	842
W00 - Commercial 2 - Cafe	-	100	100	344
W00 - Commercial 2 - Cafe Kitchen	-	100	-	180
W00 - Commercial 4 - Cafe	-	100	100	295
W00 - Commercial 4 - Cafe Kitchen	-	100	-	181

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?
W00 - Commercial 1 - Office	NO (-63.8%)	NO
W00 - Commercial 3 - Retail	NO (-54.7%)	NO
W00 - Commercial 5 - Retail	NO (-30.7%)	NO
W00 - Commercial 6 - Office	NO (-44.8%)	NO
W00 - Commercial 2 - Cafe	NO (-25.7%)	NO
W00 - Commercial 2 - Cafe Kitchen	NO (-58.4%)	NO
W00 - Commercial 4 - Cafe	NO (-17.8%)	NO
W00 - Commercial 4 - Cafe Kitchen	NO (-58.8%)	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?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	993.2	993.2
External area [m²]	1572.8	1572.8
Weather	SWI	SWI
Infiltration [m³/hm²@ 50Pa]	5	3
Average conductance [W/K]	627.14	684.33
Average U-value [W/m²K]	0.4	0.44
Alpha value* [%]	10	10

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

Building Use

% Area	Building Type
42	**A1/A2 Retail/Financial and Professional services**
32	**A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways**
26	**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
	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	13.56	13.9
Cooling	6.87	8.8
Auxiliary	7.68	4.24
Lighting	22.22	47.74
Hot water	35.63	38.87
Equipment*	63.16	63.16
TOTAL**	**85.95**	**113.55**

* 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/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	Notional
Heating + cooling demand [MJ/m²]	117.52	163.14
Primary energy* [kWh/m²]	238.79	241.65
Total emissions [kg/m²]	40.5	46.2

* 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	43.6	74	13.6	6.9	7.7	0.89	2.99	0.91	4
	Notional	43.1	120	13.9	8.8	4.2	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	W0000000:Surf[1]
Floor	0.2	0.15	W0000000:Surf[0]
Roof	0.15	-	UNKNOWN
Windows, roof windows, and rooflights	1.5	1.6	W0000000:Surf[2]
Personnel doors	1.5	2.2	W0000000:Surf[10]
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	5