BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Bedford Row_220912

As designed

Date: Wed Oct 12 16:36:54 2022

Administrative information

Building Details

Address: Address 1, Address 2, City, Postcode

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.17

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

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	20.1
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	20.1
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	16.2
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	0.31	1.79	"ST000038_W4_A0"
Floor	0.25	0.26	1.09	"ST00003E_C_A0"
Roof	0.25	0.18	0.18	"ST000002_C"
Windows***, roof windows, and rooflights	2.2	1.62	1.8	"RC00000C_C_O0"
Personnel doors	2.2	2.2	2.2	"ST00001A_W1_O0"
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

$U_{a\text{-}Limit}$ = 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	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	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- Be Green Underfloor/panel heaters

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	1	-	-	-	-
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					YES

2- Be Green VRF with Instant (Copy)

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	4.02	2.6	-	-	-
Standard value	2.5*	2.6	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 all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- SYST0006-DHW

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

2- SYST0002-DHW

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	4.28	0.012
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

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**
0B_WC 1	-	-	0.4	-	-	-	-	-	-	-	N/A
0B_Plant Room B	-	-	0.4	-	-	-	-	-	-	-	N/A
0B_WC 2	-	-	0.4	-	-	-	-	-	-	-	N/A
0B_Plant Room A	-	-	0.4	-	-	-	-	-	-	-	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	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
0B_WC 3	-	-	0.4	-	-	-	-	-	-	-	N/A
0B_Shower	-	-	0.4	-	-	-	-	-	-	-	N/A
0B_Toilet	-	-	0.4	-	-	-	-	-	-	-	N/A
0B_Showe 2	-	-	0.4	-	-	-	-	-	-	-	N/A
00_WC1	-	-	0.4	-	-	-	-	-	-	-	N/A
00_WC 2	-	-	0.4	-	-	-	-	-	-	-	N/A
01_WC 2	-	-	0.4	-	-	-	-	-	-	-	N/A
01_WC1	-	-	0.4	-	-	-	-	-	-	-	N/A
02_WC1	-	-	0.4	-	-	-	-	-	-	-	N/A
02_WC 2	-	-	0.4	-	-	-	-	-	-	-	N/A
03_WC 1	-	-	0.4	-	-	-	-	-	-	-	N/A
0B_LB Office	-	-	-	1.9	-	-	-	-	-	0.7	0.5
00_BR Office	-	-	-	1.9	-	-	-	-	-	0.7	0.5
00_Reception	-	-	-	1.9	-	-	-	-	-	0.7	0.5
00_LB Office	-	-	-	1.9	-	-	-	-	-	0.7	0.5
01_LB Office	-	-	-	1.9	-	-	-	-	-	0.7	0.5
01_JF Office	-	-	-	1.9	-	-	-	-	-	0.7	0.5
02_JF Office	-	-	-	1.9	-	-	-	-	-	0.7	0.5
01_BR Office	-	-	-	1.9	-	-	-	-	-	0.7	0.5
02_BR Office	-	-	-	1.9	-	-	-	-	-	0.7	0.5
03_BR Office	-	-	-	1.9	-	-	-	-	-	0.7	0.5
0B_BR Office	-	-	-	1.9	-	-	-	-	-	0.7	0.5
00_JF Office	-	-	-	1.9	-	-	-	-	-	0.7	0.5

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
0B_Staircase 1	-	110	-	25
0B_Lift 1	110	-	-	6
0B_Staff/CCTV	-	110	-	18
0B_Dry Riser 1	110	-	-	6
0B_WC 1	-	110	-	26
0B_Corridor 1	-	110	-	48
0B_Plant Room B	110	-	-	179
0B_WC 2	-	110	-	20
0B_Cycle Storage	110	-	-	37
0B_Core 2	-	110	-	55
0B_Plant Room A	110	-	-	103
0B_Lift 2	110	-	-	6
0B_WC 3	-	110	-	40
0B_Lockers	110	-	-	10
0B_Corridor	-	110	-	30
0B_Shower	-	110	-	26

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
0B_Toilet Corridor	-	110	-	31
0B_Dry Riser 2	110	-	-	3
0B_Cleaner St	110	-	-	7
0B_Toilet	-	110	-	50
0B_Site	110	-	-	6
0B_Showe 2	-	110	-	14
00_Staircase 1	-	110	-	30
00_Fire Escape	-	110	-	35
00_Post	-	110	-	17
00_Lift 1	110	-	-	8
00_Lobby 1	-	110	-	17
00_WC1	-	110	-	34
00_WC 2	-	110	-	35
00_Lift 2	110	-	-	6
00_Dry Riser 2	110	-	-	3
00_Core 2	-	110	-	20
00_Refuse Store	110	-	-	23
01_Staircase 2	-	110	-	33
01_Staircase 1	-	110	-	28
01_Lift 2	110	-	-	6
01_Site	110	-	-	2
01_WC 2	-	110	-	37
01_Core 1	-	110	-	32
01_Lift 1	110	-	-	7
01_Fire Stair	-	110	-	13
01_Dry Riser 2	110	-	-	4
01_Core 2	-	110	-	20
01_Dry riser	110	-	-	8
01_WC1	-	110	-	31
02_WC1	-	110	-	42
02_Dry Riser 1	110	-	-	8
02_Core 1	-	110	-	24
02_Staircase 1	-	110	-	28
02_Lift 1	110	-	-	7
02_Staircase 2	-	110	-	33
02_Lift 2	110	-	-	6
02_WC 2	-	110	-	36
02_Core 2	-	110	-	20
02_Dry Riser 2	110	-	-	4
03_Staircase 1	-	110	-	28
03_Lift 1	110	-	-	7
03_Lift Wall	-	110	-	6
03_Core 1	-	110	-	31

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
03_Dry riser	110	-	-	8
03_WC 1	-	110	-	30
00_JF Entrance	-	110	-	59
00_Bike Access	110	-	-	16
0B_Core 1	-	110	-	18
0B_Core 1	-	110	-	32
00_Core 1	-	110	-	14
00_Core 1	-	110	-	27
00_Lobby 2	-	110	-	14
00_Lobby 2	-	110	-	6
01_Lobby	-	110	-	12
01_Lobby	-	110	-	6
02_Lobby 1	-	110	-	6
0B_LB Office	110	-	-	895
00_BR Office	110	-	-	842
00_Reception	-	110	110	151
00_LB Office	110	-	-	1065
01_LB Office	110	-	-	780
01_JF Office	110	-	-	1233
02_JF Office	110	-	-	1239
01_BR Office	110	-	-	1231
02_BR Office	110	-	-	1231
03_BR Office	110	-	-	1233
0B_BR Office	110	-	-	1179
00_JF Office	110	-	-	937

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?
0B_LB Office	NO (-18.9%)	NO
00_BR Office	NO (-82.9%)	NO
00_Reception	NO (-58.8%)	NO
00_LB Office	YES (+64.7%)	NO
01_LB Office	NO (-40.5%)	NO
01_JF Office	NO (-68%)	NO
02_JF Office	NO (-74.1%)	NO
01_BR Office	NO (-61.9%)	NO
02_BR Office	NO (-60.4%)	NO
03_BR Office	NO (-65.7%)	NO
0B_BR Office	NO (-95.3%)	NO
00_JF Office	NO (-59.2%)	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?	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]	2975.6	2975.6
External area [m^2]	2502	2502
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	5	3
Average conductance [W/K]	1164.05	1314.55
Average U-value [W/m^2K]	0.47	0.53
Alpha value* [%]	19.32	22.33

* 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
100	**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/m^2]

	Actual	Notional
Heating	7.9	7.7
Cooling	4.61	7.48
Auxiliary	5.3	3.16
Lighting	9.56	19.44
Hot water	3.9	5.37
Equipment*	39.14	39.14
TOTAL**	**31.28**	**43.15**

* 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]	119.78	134.12
Primary energy* [kWh/m^2]	96.02	111.74
Total emissions [kg/m^2]	16.2	20.1

* 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] Central heating using water: radiators, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	96	13	28.4	0	4.2	0.94	0	1	0
	Notional	78.7	35.7	26.7	0	4.6	0.82	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	13.3	110.2	0.9	6.2	5.7	3.94	4.96	4.02	6.63
	Notional	11	129.9	1.3	10	2.7	2.43	3.6	----	----

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	0.3	"ST000001_W1"
Floor	0.2	0.25	"ST000002_F"
Roof	0.15	0.18	"ST000002_C"
Windows, roof windows, and rooflights	1.5	1.6	"ST00000B_W4_O0"
Personnel doors	1.5	2.2	"ST00001A_W1_O0"
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"

$U_{i\text{-}Typ}$ = 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