BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

1MS (Be Green)

As designed

Date: Tue Apr 25 09:14:42 2023

Administrative information

Building Details

Address: Address 1, City, Postcode

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.19

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.19

BRUKL compliance module version: v6.1.e.0

Foundation area [m²]: 975.66

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

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	3.21	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	2.51	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	35.15	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	27.13	
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	0.12	0.12	G1000799:Surf[0]
Floors	0.18	0.18	0.18	G2000190:Surf[1]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.18	0.18	G10007CA:Surf[0]
Windows** and roof windows	1.6	1.43	1.45	L0000040: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/(m²K)] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [W/(m²K)]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [W/(m²K)]

* 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/m²K

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	3

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- Radiators + Nat Vent

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	-	0.2	-	-
Standard value	2.5*	N/A	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- DX Split

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	6.7	-	-	-
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.					

3- Radiators + Zonal Ext

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	-	0.2	-	-
Standard value	2.5*	N/A	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.					

4- Radiators + Zonal HR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	-	0.2	-	0.9
Standard value	2.5*	N/A	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.					

5- VRF + Central HR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	4	0	1.5	0.8
Standard value	2.5*	N/A	N/A	2^	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. ^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

6- Retail VRF

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	4	0	1.1	0.9
Standard value	2.5*	N/A	N/A	2^	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. ^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

1- DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.5	0.002
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

2- Retail DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
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
G-1 Comms	-	-	0.3	-	-	-	-	-	-	-	N/A
G-1 Comms	-	-	0.3	-	-	-	-	-	-	-	N/A
G-1 Cycle Store	-	-	0.3	-	-	-	-	-	-	-	N/A
G-1 Cycle Store	-	-	0.3	-	-	-	-	-	-	-	N/A
G-2 Drying Room	-	-	-	1.1	-	-	-	-	-	-	N/A
G-2 FM Office	-	-	-	1.1	-	-	-	-	-	-	N/A
G-2 Office Showers	-	-	-	1.1	-	-	-	-	-	-	N/A
G-2 Office Showers	-	-	-	1.1	-	-	-	-	-	-	N/A
G-2 Refuse Store	-	-	0.3	-	-	-	-	-	-	-	N/A
G-2 Refuse Store	-	-	0.3	-	-	-	-	-	-	-	N/A
G-2 Refuse Store	-	-	0.3	-	-	-	-	-	-	-	N/A
G-2 Refuse Store	-	-	0.3	-	-	-	-	-	-	-	N/A
G-2 Shower	-	-	-	1.1	-	-	-	-	-	-	N/A
G-2 Shower	-	-	-	1.1	-	-	-	-	-	-	N/A
G-2 Shower	-	-	-	1.1	-	-	-	-	-	-	N/A
G-2 Shower Vent	-	-	-	1.1	-	-	-	-	-	-	N/A
G-2 Showers	-	-	-	1.1	-	-	-	-	-	-	N/A
G-2 Showers	-	-	-	1.1	-	-	-	-	-	-	N/A
G-2 Staff Room	-	-	-	1.1	-	-	-	-	-	-	N/A
G-2 Unisex Shower	-	-	-	1.1	-	-	-	-	-	-	N/A
G-2 WC	-	-	0.3	-	-	-	-	-	-	-	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
G-2 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
G-2 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
G-2 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
G-2 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
G-2 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
G-2 WC Extract	-	-	0.3	-	-	-	-	-	-	-	N/A
L-00 Cycle Store Entrance	-	-	0.3	-	-	-	-	-	-	-	N/A
L-00 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-00 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-01 Cleaner	-	-	0.3	-	-	-	-	-	-	-	N/A
L-01 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-02 Cleaner	-	-	0.3	-	-	-	-	-	-	-	N/A
L-02 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-03 Cleaner	-	-	0.3	-	-	-	-	-	-	-	N/A
L-03 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-04 Cleaner	-	-	0.3	-	-	-	-	-	-	-	N/A
L-04 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-05 Cleaner	-	-	0.3	-	-	-	-	-	-	-	N/A
L-05 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-06 Cleaner	-	-	0.3	-	-	-	-	-	-	-	N/A
L-06 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-07 Cleaner	-	-	0.3	-	-	-	-	-	-	-	N/A
L-07 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-08 Cleaner	-	-	0.3	-	-	-	-	-	-	-	N/A
L-08 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-09 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-10 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-11 Cleaner	-	-	0.3	-	-	-	-	-	-	-	N/A
L-11 Store	-	-	0.3	-	-	-	-	-	-	-	N/A
L-11 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-11 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-11 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-12 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-13 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-14 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-15 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-16 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-17 WC	-	-	0.3	-	-	-	-	-	-	-	N/A
L-18 WC	-	-	0.3	-	-	-	-	-	-	-	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
G-1 Circulation	110	-	-

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
G-1 Comms	140	-	-
G-1 Comms	140	-	-
G-1 Cycle Store	140	-	-
G-1 Cycle Store	140	-	-
G-1 Staircase	110	-	-
G-2 AHU Plant	140	-	-
G-2 AHU Plant	140	-	-
G-2 Basement Ventilation	140	-	-
G-2 Circulation	110	-	-
G-2 Circulation	110	-	-
G-2 Circulation	110	-	-
G-2 Circulation	110	-	-
G-2 Circulation	110	-	-
G-2 Circulation	110	-	-
G-2 Circulation	110	-	-
G-2 Circulation	110	-	-
G-2 Circulation	110	-	-
G-2 Circulation	110	-	-
G-2 Circulation	110	-	-
G-2 Cold Water Storage	140	-	-
G-2 Drying Room	110	-	-
G-2 FM Office	110	-	-
G-2 Heating Plant	140	-	-
G-2 Loading Bay	110	-	-
G-2 Office Showers	110	-	-
G-2 Office Showers	110	-	-
G-2 Refuse Store	140	-	-
G-2 Refuse Store	140	-	-
G-2 Refuse Store	140	-	-
G-2 Refuse Store	140	-	-
G-2 Shower	110	-	-
G-2 Shower	110	-	-
G-2 Shower	110	-	-
G-2 Shower Vent	110	-	-
G-2 Showers	110	-	-
G-2 Showers	110	-	-
G-2 Sprinker Plant	140	-	-
G-2 Sprinker Plant	140	-	-
G-2 Staff Room	110	-	-
G-2 Staircase	110	-	-
G-2 Staircase	110	-	-
G-2 Storage	140	-	-
G-2 Switch Room	140	-	-

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
G-2 Unisex Shower	110	-	-
G-2 WC	110	-	-
G-2 WC	110	-	-
G-2 WC	110	-	-
G-2 WC	110	-	-
G-2 WC	110	-	-
G-2 WC	110	-	-
G-2 WC Extract	110	-	-
L-00 BOH	110	-	-
L-00 Circulation	110	-	-
L-00 Circulation	110	-	-
L-00 Circulation	110	-	-
L-00 Circulation	110	-	-
L-00 Circulation	110	-	-
L-00 Circulation	110	-	-
L-00 Circulation	110	-	-
L-00 Circulation	110	-	-
L-00 Circulation	110	-	-
L-00 Cycle Store Entrance	110	-	-
L-00 Flexible Class E (cafe/workspace)	110	-	-
L-00 Flexible Class E	110	80	1.5
L-00 Flexible Class E	110	80	1.5
L-00 Flexible Class E	110	80	1.5
L-00 Flexible Class E	110	80	1.5
L-00 Office Lobby	110	80	1.35
L-00 Post Room	110	-	-
L-00 Security & Fire Risk	110	-	-
L-00 WC	110	-	-
L-00 WC	110	-	-
L-01 Circulation	110	-	-
L-01 Circulation	110	-	-
L-01 Circulation	110	-	-
L-01 Circulation	110	-	-
L-01 Circulation	110	-	-
L-01 Circulation	110	-	-
L-01 Cleaner	110	-	-
L-01 Office	140	-	-
L-01 WC	110	-	-
L-02 Cleaner	110	-	-
L-02 Circulation	110	-	-
L-02 Circulation	110	-	-
L-02 Circulation	110	-	-
L-02 Circulation	110	-	-