BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Reading Police Station- Retail

As designed

Date: Wed Apr 08 15:05:23 2026

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: 7.0.27

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.27

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

Foundation area [m²]: 817.39

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

The building does not comply with England Building Regulations Part L 2021

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	3.88	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	3.87	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	42.71	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	43.1	
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	BS000003:Surf[3]
Floors	0.18	0.1	0.1	BS000003:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.1	0.1	BS000003:Surf[1]
Windows** and roof windows	1.6	1.2	1.21	BS000003:Surf[2]
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)]

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

$U_{i\text{-Calc}}$ = Calculated maximum individual element 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	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- WSHP VRF

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.2	3.21	0	-	0.75
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- WSHP VRF (Retail)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.2	3.21	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.

1- Direct electric 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**
Basement Police Rm	-	-	-	1.2	-	-	-	-	-	-	N/A
GF Block B Retail	-	-	-	1.1	-	-	-	-	-	-	N/A
GF Block A Retail 1	-	-	-	1.1	-	-	-	-	-	-	N/A
GF Block A Retail 4	-	-	-	1.1	-	-	-	-	-	-	N/A
GF Block A Retail 2	-	-	-	1.1	-	-	-	-	-	-	N/A
GF Block A Retail 3	-	-	-	1.1	-	-	-	-	-	-	N/A
GF Block A Retail 5	-	-	-	1.1	-	-	-	-	-	-	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
GF Convenience Food Store (chill)	-	-	-	1.1	-	-	-	-	-	-	N/A
GF Convenience Food Store	-	-	-	1.1	-	-	-	-	-	-	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
Basement Police Rm	150	-	-
Basement Non-Resi Bike Store	150	-	-
Basement Non-Resi Refuse Store	150	-	-
GF Block B Retail	150	100	1.2
GF Block A Retail 1	150	100	1.2
GF Block A Retail 4	150	100	1.2
GF Block A Retail 2	150	100	1.2
GF Retail LV Switchroom	125	-	-
GF Block A Retail 3	150	100	1.2
GF Block A Retail 5	150	100	1.2
GF Convenience Food Store (chill)	150	100	1.2
GF Convenience Food Store	150	100	1.2

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?
Basement Police Rm	NO (-27.1%)	NO
GF Block B Retail	NO (-43.2%)	NO
GF Block A Retail 1	NO (-29.6%)	NO
GF Block A Retail 4	NO (-23.7%)	NO
GF Block A Retail 2	NO (-65.7%)	NO
GF Block A Retail 3	NO (-38.7%)	NO
GF Block A Retail 5	NO (-5.5%)	NO
GF Convenience Food Store (chill)	NO (-33.8%)	NO
GF Convenience Food Store	NO (-2.1%)	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]	1753.1	1753.1
External area [m^2]	2044.4	2129.1
Weather	SWI	SWI
Infiltration [m^3/hm^2@ 50Pa]	3	3
Average conductance [W/K]	679.97	694.73
Average U-value [W/m^2K]	0.33	0.33
Alpha value* [%]	9.97	10

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

Building Use

% Area	Building Type
94	**Retail/Financial and Professional Services**
	Restaurants and Cafes/Drinking Establishments/Takeaways
6	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	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	1.87	1.45
Cooling	13.36	7.25
Auxiliary	2.97	2.16
Lighting	9.6	16.65
Hot water	1.74	1.57
Equipment*	51.73	51.73
TOTAL**	**29.54**	**29.08**

* 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
Displaced electricity	*0*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	129.71	135.42
Primary energy [kWh_{PE}/m^2]	43.1	42.71
Total emissions [kg/m^2]	3.87	3.88

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	39.4	54.9	3.7	6.7	2.1	2.98	2.28	3.2	3.21
	Notional	47.7	37.6	4.8	2.3	1.3	2.78	4.63	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	20.4	121.7	1.9	14.8	3.3	2.98	2.28	3.2	3.21
	Notional	13.4	135.8	1.3	8.1	2.4	2.78	4.63	----	----
[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