BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

14 Bedford Row + 12-14 Jockey's Fields - Be Lean

As designed

Date: Mon Apr 29 07:38:29 2024

Administrative information

Building Details

Address: 14 Bedford row + 12 - 14 Jockey's Fields, London, WC1R 4ED

Certifier details

Name: Mohanad Alnaimy

Telephone number: Phone

Address: The Lab, 18 Wenlock Rd, London, N1 7TA

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.22

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.22

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

Foundation area [m^2]: 290.52

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	55.57	
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	64.21	
Target primary energy rate (TPER), kWh_{PE}/m^2.annum	300.99	
Building primary energy rate (BPER), kWh_{PE}/m^2.annum	350.36	
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	0.25	0.31	F4000004:Surf[0]
Floors	0.18	0.56	1.45	GF000022:Surf[5]
Pitched roofs	0.16	0.11	0.11	F4000001:Surf[0]
Flat roofs	0.18	0.12	0.18	GF00000C:Surf[0]
Windows** and roof windows	1.6	1.49	1.6	F2000006:Surf[4]
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	1.56	1.56	F2000006:Surf[2]

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$]

$U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* 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/m^2K

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	8

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	<0.9

1- Lean: Combined

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.91	-	0.2	-	0.85
Standard value	0.93*	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 gas single boiler systems <=2 MW output and overall for multi-boiler systems. For single boiler systems >2 MW or any individual boiler in a multi-boiler system, limiting efficiency is 0.88.

1- Lean: Combined

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	0.91	0.005
Standard value	0.91	N/A

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

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
F (4) - Plant - N/A	95	-	-
F (2) - Stair A - 201	95	-	-
F (1) - Stair A - 101	95	-	-
F (4) - Stair A - 401	95	-	-
F (3) - Stair A - 301	95	-	-
GF - Stair A - G01	95	-	-
F (-1) - Stair A - B01	95	-	-
F (1) - Stair B - 102	95	-	-
F (3) - Stair B - 302	95	-	-
F (-1) - Studio - B14	100	-	-
F (-1) - Corridor - B13	95	-	-
F (-1) - Studio - B21	100	-	-
F (-1) - Studio - B20	100	-	-
F (-1) - CS - B18	95	-	-
F (-1) - Studio - B27	100	-	-
F (-1) - Studio - B26	100	-	-
F (-1) - Studio - B25	100	-	-
F (-1) - Studio - B19	100	-	-
F (-1) - Stair B - B02	95	-	-
F (-1) - Studio - B34	100	-	-
F (-1) - Elec Intake - B40	95	-	-
F (-1) - Breakout - B33	95	-	-
F (-1) - DDA/WC - B39	95	-	-
F (-1) - Amenity - B32	95	-	-

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
F (-1) - Cycle Store - G35	95	-	-
F (-1) - Server -- B33	95	-	-
F (-1) - Corridor - G31	95	-	-
F (-1) - Stair C - G03	95	-	-
F (-1) - Corridor - B17	95	-	-
GF - Amenity - G13	95	-	-
GF - Studio -G15	100	-	-
GF - Corridor - G23	95	-	-
GF - Studio - G25	100	-	-
GF - Studio - G22	100	-	-
GF - Studio - G24	100	-	-
GF - Corridor - G27	95	-	-
GF - Refuse - G28	95	-	-
GF - Studio - G29	100	-	-
GF - Stair B - G26	95	-	-
GF - Enterance - G26	95	-	-
GF - Plant - G32	95	-	-
F (2) - Stair C - 203	95	-	-
F (2) - Studio - 233	100	-	-
F (2) - Studio - 228	100	-	-
F (2) - Studio - 227	100	-	-
F (2) - Studio - 229	100	-	-
F (2) - Studio - 230	100	-	-
F (2) - Corridor - 226	95	-	-
F (2) - Studio - 224	100	-	-
F (2) - Studio - 222	100	-	-
F (2) - Studio - 223	100	-	-
F (1) - Studio - 116	100	-	-
F (1) - Studio - 117	100	-	-
F (1) - Studio - 114	100	-	-
F (1) - Studio - 115	100	-	-
F (1) - Corridor - 113	95	-	-
F (1) - Studio - 121	100	-	-
F (1) - Studio - 122	100	-	-
F (1) - Studio - 123	100	-	-
F (1) - Studio - 131	100	-	-
F (1) - Stair C - 103	95	-	-
F (1) - Corridor - 124	95	-	-
F (2) - Studio - 231	100	-	-
F (2) - Studio - 232	100	-	-
F (1) - Studio - 130	100	-	-
F (1) - Studio - 129	100	-	-
F (1) - Studio - 128	100	-	-

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
F (1) - Studio - 127	100	-	-
F (1) - Studio - 125	100	-	-
F (1) - Studio - 126	100	-	-
F (3) - Stair C - 303	95	-	-
F (3) - Studio - 325	100	-	-
F (3) - Studio - 326	100	-	-
F (3) - Studio - 327	100	-	-
F (3) - Studio - 328	100	-	-
F (3) - Corridor - 320	95	-	-
F (3) - Studio - 329	100	-	-
F (3) - Studio - 323	100	-	-
F (3) - Studio - 324	100	-	-
F (2) - Studio - 214	100	-	-
F (2) - Studio - 215	100	-	-
F (2) - Studio - 216	100	-	-
F (2) - Studio - 217	100	-	-
F (3) - Studio - 314	100	-	-
F (3) - Studio - 315	100	-	-
F (2) - Corridor - 213	95	-	-
F (3) - Studio - 316	100	-	-
F (3) - Studio - 318	100	-	-
F (3) - Corridor - 313	95	-	-
F (4) - Studio - 415	100	-	-
F (4) - Studio - 414	100	-	-
F (4) - Studio - 416	100	-	-
F (4) - Corridor - 413	95	-	-
F (-1) - Corridor - B30	95	-	-
F (1) - Corridor - 119	95	-	-
F (1) - Studio - 120	100	-	-
F (2) - Studio - 221	100	-	-
F (2) - Corridor - 220	95	-	-
F (3) - Studio - 322	100	-	-
F (3) - Corridor - 321	95	-	-
F (-1) - Studio - B23	100	-	-
F(1) - WC	95	-	-
F (1) - Studio - 118	100	-	-
F (2) - Studio - 218	100	-	-
F (3) - Studio - 319	100	-	-
F (4) - Studio - 417	100	-	-
GF - Studio - G21	100	-	-
GF - Studio - G18	100	-	-
GF - Corridor - G 14,16,17,20	95	-	-

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?
F (-1) - Studio - B14	NO (-68.1%)	NO
F (-1) - Studio - B21	NO (-55%)	NO
F (-1) - Studio - B20	NO (-61.5%)	NO
F (-1) - Studio - B27	NO (-79.8%)	NO
F (-1) - Studio - B26	NO (-73.2%)	NO
F (-1) - Studio - B25	NO (-72.2%)	NO
F (-1) - Studio - B19	NO (-86%)	NO
F (-1) - Studio - B34	NO (-95.7%)	NO
F (-1) - Breakout - B33	N/A	N/A
GF - Studio -G15	NO (-27.1%)	NO
GF - Studio - G25	NO (-69.6%)	NO
GF - Studio - G22	NO (-34%)	NO
GF - Studio - G24	NO (-59.3%)	NO
GF - Refuse - G28	NO (-66.3%)	NO
GF - Studio - G29	NO (-67.4%)	NO
GF - Enterance - G26	N/A	N/A
F (2) - Studio - 233	NO (-47.2%)	NO
F (2) - Studio - 228	NO (-35.8%)	NO
F (2) - Studio - 227	NO (-52.3%)	NO
F (2) - Studio - 229	NO (-33.5%)	NO
F (2) - Studio - 230	YES (+19.2%)	NO
F (2) - Studio - 224	NO (-21.5%)	NO
F (2) - Studio - 222	NO (-23.6%)	NO
F (2) - Studio - 223	NO (-18.7%)	NO
F (1) - Studio - 116	YES (+35.7%)	NO
F (1) - Studio - 117	NO (-20.9%)	NO
F (1) - Studio - 114	YES (+23.3%)	NO
F (1) - Studio - 115	NO (-20.9%)	NO
F (1) - Studio - 121	NO (-11%)	NO
F (1) - Studio - 122	NO (-29.1%)	NO
F (1) - Studio - 123	NO (-30.3%)	NO
F (1) - Studio - 131	NO (-59.6%)	NO
F (2) - Studio - 231	YES (+20.8%)	NO
F (2) - Studio - 232	NO (-15.4%)	NO
F (1) - Studio - 130	NO (-28.6%)	NO
F (1) - Studio - 129	YES (+3.7%)	NO
F (1) - Studio - 128	YES (+2.2%)	NO
F (1) - Studio - 127	NO (-44.1%)	NO
F (1) - Studio - 125	NO (-63.6%)	NO
F (1) - Studio - 126	NO (-45.6%)	NO
F (3) - Studio - 325	NO (-13.5%)	NO
F (3) - Studio - 326	NO (-63%)	NO
F (3) - Studio - 327	NO (-39.8%)	NO
F (3) - Studio - 328	YES (+12.4%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
F (3) - Studio - 329	NO (-45.9%)	NO
F (3) - Studio - 323	NO (-6.5%)	NO
F (3) - Studio - 324	NO (-10.2%)	NO
F (2) - Studio - 214	YES (+5.5%)	NO
F (2) - Studio - 215	NO (-32.2%)	NO
F (2) - Studio - 216	YES (+15.7%)	NO
F (2) - Studio - 217	NO (-32.4%)	NO
F (3) - Studio - 314	YES (+9.4%)	NO
F (3) - Studio - 315	NO (-29.8%)	NO
F (3) - Studio - 316	YES (+20.9%)	NO
F (3) - Studio - 318	NO (-25.6%)	NO
F (4) - Studio - 415	NO (-69.7%)	NO
F (4) - Studio - 414	NO (-62.6%)	NO
F (4) - Studio - 416	NO (-69.4%)	NO
F (1) - Studio - 120	N/A	N/A
F (2) - Studio - 221	NO (-23.4%)	NO
F (3) - Studio - 322	NO (-4.3%)	NO
F (-1) - Studio - B23	NO (-72.7%)	NO
F(1) - WC	N/A	N/A
F (1) - Studio - 118	NO (-8.1%)	NO
F (2) - Studio - 218	NO (-15.2%)	NO
F (3) - Studio - 319	NO (-23.7%)	NO
F (4) - Studio - 417	NO (-65.1%)	NO
GF - Studio - G21	NO (-32.6%)	NO
GF - Studio - G18	NO (-60.9%)	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]	2033.6	2033.6
External area [m^2]	2395.8	2395.8
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	8	3
Average conductance [W/K]	1112.77	994.77
Average U-value [W/m^2K]	0.46	0.42
Alpha value* [%]	25.34	10

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

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
100	**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	77.75	59.37
Cooling	0	0
Auxiliary	3.17	2.91
Lighting	5.82	6
Hot water	222.73	202.41
Equipment*	20.62	20.62
TOTAL**	**309.47**	**270.69**

* 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	1.08	4.7
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*1.08*	*4.7*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	249.12	193.48
Primary energy [kWh_{PE}/m^2]	350.36	300.99
Total emissions [kg/m^2]	64.21	55.57

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] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	249.1	0	77.8	0	3.2	0.89	0	0.91	0
	Notional	193.5	0	59.4	0	2.3	0.91	0	----	----
[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