BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

81-84 Chalk Farm Road

As designed

Date: Tue Oct 31 11:19:01 2023

Administrative information

Building Details

Address: 81-84 Chalk Farm Road, LONDON, NW1 8AL

Certifier details

Name: Neil Ingham

Telephone number:

Address: Holborn Tower, 137-144 High Holborn London, WC1V 6PL

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.2.0

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

Foundation area [m²]: 290.85

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), $kgCO_2/m^2annum$	6.4	
Building CO_2 emission rate (BER), $kgCO_2/m^2annum$	8.89	
Target primary energy rate (TPER), kWh_{PE}/m^2annum	39.62	
Building primary energy rate (BPER), kWh_{PE}/m^2annum	62.34	
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	0.28	0.28	Floor 0 - WCs_W_7
Floors	0.18	0.25	0.25	Floor 0 - WCs_S_3
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.15	0.15	Floor 1 - Stairs_R_4
Windows** and roof windows	1.6	1.4	1.4	Floor 1 - Stairs_G_10
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	1.8	1.8	Floor 0 - Circ and stairs_D_12
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-}Limit}$ = 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	10

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	<0.9

1- Gas heat

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.93	-	-	-	-
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.

2- Gas heat/Mech Cooling

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.93	6.1	-	-	-
Standard value	0.93*	5	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 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- From Main heating

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0.002
Standard value	N/A	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
Floor 0 - WCs	-	-	0.5	-	-	-	-	-	-	-	N/A
Floor 0 - WC Amb	-	-	0.5	-	-	-	-	-	-	-	N/A
Floor 1 - WCs	-	-	0.5	-	-	-	-	-	-	-	N/A
Floor 2 - WCs	-	-	0.5	-	-	-	-	-	-	-	N/A
Floor 0 - Classrooms 1	-	-	-	-	1	-	-	-	-	0.8	N/A
Floor 0 - Office 1	-	-	-	-	1	-	-	-	-	0.8	N/A
Floor 0 - Office	-	-	-	-	1	-	-	-	-	0.8	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
Floor 0 - Breakout	-	-	-	-	1	-	-	-	-	0.8	N/A
Floor 1 - Breakout	-	-	-	-	1	-	-	-	-	0.8	N/A
Floor 1 - Classrooms	-	-	-	-	1	-	-	-	-	0.8	N/A
Floor 1 - Office	-	-	-	-	1	-	-	-	-	0.8	N/A
Floor 1 - Machine room	-	-	-	-	1	-	-	-	-	0.8	N/A
Floor 1 - Servers	-	-	0.5	-	-	-	-	-	-	-	N/A
Floor 2 - Classrooms back	-	-	-	-	1	-	-	-	-	0.8	N/A
Floor 2 - Classrooms	-	-	-	-	1	-	-	-	-	0.8	N/A
Floor 2 - Breakout	-	-	-	-	1	-	-	-	-	0.8	N/A
Floor 2 - Offices	-	-	-	-	1	-	-	-	-	0.8	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
Floor 0 - Store	100	-	-
Floor 0 - Stores	100	-	-
Floor 1 - Store 1	100	-	-
Floor 1 - Store 2	100	-	-
Floor 1 - Store	100	-	-
Floor 1 - Plant	100	-	-
Floor 0 - WCs	100	-	-
Floor 0 - WC Amb	100	-	-
Floor 0 - Circ and stairs	100	-	-
Floor 0 - Circ and lift	100	-	-
Floor 1 - Stairs	100	-	-
Floor 1 - WCs	100	-	-
Floor 1 - Circ	100	-	-
Floor 2 - Circ	100	-	-
Floor 2 - WCs	100	-	-
Floor 2 - Stairs	100	-	-
Floor 2 - Staff room	100	-	-
Floor 0 - Classrooms 1	100	-	-
Floor 0 - Office 1	100	-	-
Floor 0 - Office	100	-	-
Floor 0 - Breakout	100	-	-
Floor 0 - Reception	100	90	1.5
Floor 1 - Breakout	100	-	-
Floor 1 - Classrooms	100	-	-
Floor 1 - Office	100	-	-
Floor 1 - Machine room	100	-	-
Floor 1 - Servers	100	-	-
Floor 2 - Classrooms back	100	-	-
Floor 2 - Classrooms	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
Floor 2 - Breakout	100	-	-
Floor 2 - Offices	100	-	-

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?
Floor 0 - Stores	N/A	N/A
Floor 0 - Classrooms 1	N/A	N/A
Floor 0 - Office 1	N/A	N/A
Floor 0 - Office	NO (-58.6%)	NO
Floor 0 - Breakout	YES (+95.1%)	NO
Floor 0 - Reception	NO (-35.5%)	NO
Floor 1 - Breakout	YES (+12.8%)	NO
Floor 1 - Classrooms	N/A	N/A
Floor 1 - Office	NO (-38.5%)	NO
Floor 1 - Machine room	N/A	N/A
Floor 1 - Servers	N/A	N/A
Floor 2 - Classrooms back	N/A	N/A
Floor 2 - Classrooms	NO (-19.7%)	NO
Floor 2 - Breakout	N/A	N/A
Floor 2 - Offices	N/A	N/A

Regulation 25A: Consideration of high efficiency 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
Floor area [m²]	918.6	918.6
External area [m²]	1178.2	1178.2
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	10	3
Average conductance [W/K]	400	479.94
Average U-value [W/m²K]	0.34	0.41
Alpha value* [%]	18.63	21.16

* 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
	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
100	**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/m²]

	Actual	Notional
Heating	13.5	10.54
Cooling	3.46	2.87
Auxiliary	7.27	4.75
Lighting	8.36	6.39
Hot water	16.22	18.84
Equipment*	17.34	17.34
TOTAL**	**48.81**	**43.39**

* 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	10.57
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*10.57*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	120.97	116.24
Primary energy [kWh_{PE}/m^2]	62.34	39.62
Total emissions [kg/m²]	8.89	6.4

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] No Heating or Cooling										
	Actual	285.2	96.4	0	0	0	0	0	0	0
	Notional	141.5	119.3	0	0	0	0	0	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Natural Gas										
	Actual	100.2	12.7	33.5	0	3.5	0.83	0	0.93	0
	Notional	82.6	89.1	26.7	0	3.4	0.86	0	----	----
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	19.8	85	6	5.2	9.1	0.91	4.56	0.93	6.1
	Notional	14	68	4.5	4.3	3.9	0.86	4.4	----	----

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

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

81-84 Chalk Farm Road

As designed

Date: Tue Oct 31 11:49:53 2023

Administrative information

Building Details

Address: 81-84 Chalk Farm Road, LONDON, NW1 8AL

Certifier details

Name: Neil Ingham

Telephone number:

Address: Holborn Tower, 137-144 High Holborn London, WC1V 6PL

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v7.2.0

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

Foundation area [m²]: 83.64

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), $kgCO_2/m^2annum$	3.12	
Building CO_2 emission rate (BER), $kgCO_2/m^2annum$	4.73	
Target primary energy rate (TPER), kWh_{PE}/m^2annum	32.32	
Building primary energy rate (BPER), kWh_{PE}/m^2annum	49.33	
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	0.18	0.18	Floor 3 - WCs_W_4
Floors	0.18	0.18	0.18	Floor 3 - WCs_F_3
Pitched roofs	0.16	0.15	0.15	Floor 3 - WCs_R_7
Flat roofs	0.18	0.15	0.15	Floor 3 - WCs_R_8
Windows** and roof windows	1.6	1.4	1.4	Block 2 - Circulation_G_7
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	-	-	No external personnel doors
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-}Limit}$ = 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	<0.9

1- Panel Rads

	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					NO

2- Notional Heat Pump

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.69	5.89	-	-	-
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					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

1- PoU

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.003
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
Floor 3 - WCs	-	-	0.5	-	-	-	-	-	-	-	N/A
Floor 3 - Offices	-	-	-	-	1	-	-	-	-	0.8	N/A
Floor 3 - Offices	-	-	-	-	1	-	-	-	-	0.8	N/A
Floor 3 - Offices	-	-	-	-	1	-	-	-	-	0.8	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
Floor 3 - WCs	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
Block 2 - Circulation	100	-	-
Floor 3 - Offices	120	-	-
Floor 3 - Offices	120	-	-
Floor 3 - Offices	120	-	-

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?
Floor 3 - Offices	NO (-51.7%)	NO
Floor 3 - Offices	NO (-22.7%)	NO
Floor 3 - Offices	YES (+13.6%)	NO

Regulation 25A: Consideration of high efficiency 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
Floor area [m²]	250.9	250.9
External area [m²]	666.7	666.7
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	3	3
Average conductance [W/K]	171.22	175.53
Average U-value [W/m²K]	0.26	0.26
Alpha value* [%]	20.13	22.18

* 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
	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
100	**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/m²]

	Actual	Notional
Heating	16.81	10.91
Cooling	2	1.67
Auxiliary	2.31	1.36
Lighting	4.6	5.97
Hot water	6.1	5.3
Equipment*	21.55	21.55
TOTAL**	**31.82**	**25.21**

* 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	3.82
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*0*	*3.82*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	131.47	119.3
Primary energy [kWh_{PE}/m^2]	49.33	32.32
Total emissions [kg/m²]	4.73	3.12

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] Other local room heater - unfanned, [HS] Room heater, [HFT] Electricity, [CFT] Natural Gas										
	Actual	101	34.3	35.1	0	1.8	0.8	0	1	0
	Notional	93.5	54.8	19.4	0	2.2	1.34	0	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	84.2	45.6	8.9	2.9	2.5	2.64	4.4	2.69	5.89
	Notional	68.6	38	7.2	2.4	1	2.64	4.4	----	----

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