

BRUKL Output Document

Compliance with England Building Regulations Part L 2013



Project name

Shell and Core

22-205 Bicester Gateway, Unit F

FOR PLANNING

Date: Wed Jun 29 15:08:21 2022

Administrative information

Building Details

Address: 22-205 Bicester Gateway, Unit F, ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.2"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.2

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

Certifier details

Name:

Telephone number:

Address: , ,

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	14.1
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	14.1
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	9.1
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 -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.35	0.35	External Wall
Floor	0.25	0.25	0.25	Ground Floor
Roof	0.25	0.16	0.16	Roof
Windows***, roof windows, and rooflights	2.2	1.37	1.4	Ware wall light GF
Personnel doors	2.2	-	-	No personal doors in project
Vehicle access & similar large doors	1.5	1.5	1.5	Level Access Door
High usage entrance doors	3.5	-	-	No high usage entrance doors in project
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* 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	3

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	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- EPH Nat Vent

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	0.91*	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. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- EPH Extract only (4 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	0.91*	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. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

3- VRF (Occupied Areas) (6 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.5	-	-	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- Elec DHW with storage

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.01
Standard value	1	N/A

2- Elec Shw

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0
Standard value	1	N/A

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	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Reception GF	-	-	-	1.6	-	-	-	-	-	-	-	N/A
WC Female 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
WC Male 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Open Off1 1F (DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
Open Off1 1F (Non DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
GF Acc_Shww	-	-	0.5	-	-	-	-	-	-	-	-	N/A
1F Off Circ	-	-	-	1.6	-	-	-	-	-	-	-	N/A
WC Acc 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Open Off2 1F (DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
Open Off2 1F (Non DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
Reception GF	NO
GF Stair	NO
1F Off Stair	NO
WC Female 1F	NO
WC Male 1F	NO
Open Off1 1F (DL)	NO
Open Off1 1F (Non DL)	NO
GF Acc_Shww	NO
1F Off Circ	NO
1F Landing	NO
WC Acc 1F	NO
Open Off2 1F (DL)	NO
Open Off2 1F (Non DL)	NO

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
	Standard value	60	60	22
Reception GF	-	100	22	133
GF Stair	-	90	-	35
Warehouse	120	-	-	2262
1F Off Stair	-	90	-	35
WC Female 1F	-	90	-	22
WC Male 1F	-	90	-	22
Open Off1 1F (DL)	100	-	-	289
Open Off1 1F (Non DL)	100	-	-	459
Warehouse (Office undercroft)	120	-	-	602
GF Acc_Shww	-	90	-	52
1F Off Circ	-	90	-	21
1F Landing	-	90	-	27
WC Acc 1F	-	90	-	23

General lighting and display lighting	Luminous efficacy [lm/W]			General lighting [W]	
	Zone name	Luminaire	Lamp		Display lamp
	Standard value	60	60	22	
	Open Off2 1F (DL)	100	-	-	129
	Open Off2 1F (Non DL)	100	-	-	124

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?
Reception GF	NO (-41%)	NO
Warehouse	NO (-30%)	NO
Open Off1 1F (DL)	NO (-37%)	NO
Open Off1 1F (Non DL)	NO (-90%)	NO
Warehouse (Office undercroft)	NO (-45%)	NO
1F Off Circ	NO (-96%)	NO
Open Off2 1F (DL)	NO (-40%)	NO
Open Off2 1F (Non DL)	NO (-92%)	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?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Area [m ²]	1001	1001		A1/A2 Retail/Financial and Professional services
External area [m ²]	2195	2195		A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	SWI	SWI	100	B1 Offices and Workshop businesses
Infiltration [m ³ /hm ² @ 50Pa]	3	7		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	779	737		B8 Storage or Distribution
Average U-value [W/m ² K]	0.35	0.34		C1 Hotels
Alpha value* [%]	3.68	3.68		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

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	2.84	4.53
Cooling	1.51	1.84
Auxiliary	1.63	1.08
Lighting	8.47	15.07
Hot water	9.87	10.52
Equipment*	21.03	21.03
TOTAL **	24.33	33.04

* 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	6.78	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	36.11	46.55
Primary energy* [kWh/m ²]	74.68	72.7
Total emissions [kg/m ²]	9.1	14.1

* 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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Other local room heater - unfanned, [HS] LTHW boiler, [HFT] Electricity, [CFT] Electricity									
Actual	130.4	0	36.2	0	0	1	0	1	0
Notional	141.1	0	47.9	0	0	0.82	0	----	----
[ST] Other local room heater - unfanned, [HS] Room heater, [HFT] Electricity, [CFT] Electricity									
Actual	160.2	0	44.5	0	18.6	1	0	1	0
Notional	303.4	0	102.9	0	22.4	0.82	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	43.3	89.5	3.4	7.1	6.2	3.5	3.5	3.5	3.5
Notional	51.7	117.7	5.9	9.1	3.6	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-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.35	External Wall
Floor	0.2	0.25	Ground Floor
Roof	0.15	0.16	Roof
Windows, roof windows, and rooflights	1.5	1.3	Rooflight 7.14x1
Personnel doors	1.5	-	No personal doors in project
Vehicle access & similar large doors	1.5	1.5	Level Access Door
High usage entrance doors	1.5	-	No high usage entrance doors in project
U _{i-Typ} = Typical individual element U-values [W/(m ² K)]		U _{i-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	3

Unit G

BRUKL Output Document



Compliance with England Building Regulations Part L 2013

Project name

Shell and Core

22-205 Bicester Gateway, Unit G

FOR PLANNING

Date: Fri Jun 24 15:54:07 2022

Administrative information

Building Details

Address: 22-205 Bicester Gateway, Unit G, ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.2"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.2

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

Certifier details

Name:

Telephone number:

Address: , ,

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	14.2
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	14.2
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	9.3
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 -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.35	0.35	External Wall
Floor	0.25	0.25	0.25	Ground Floor
Roof	0.25	0.16	0.16	Roof
Windows***, roof windows, and rooflights	2.2	1.38	1.4	Ware wall light GF
Personnel doors	2.2	-	-	No personal doors in project
Vehicle access & similar large doors	1.5	1.5	1.5	Level Access Door
High usage entrance doors	3.5	-	-	No high usage entrance doors in project
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)] * 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	3

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	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- EPH Nat Vent

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	0.91*	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. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- EPH Extract only (4 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	0.91*	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. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

3- VRF (Occupied Areas) (6 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.5	-	-	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- Elec DHW with storage

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.01
Standard value	1	N/A

2- Elec Shw

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0
Standard value	1	N/A

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	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Reception GF	-	-	-	1.6	-	-	-	-	-	-	-	N/A
WC Female 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
WC Male 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Open Off1 1F (DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
Open Off1 1F (Non DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
GF Acc_Shww	-	-	0.5	-	-	-	-	-	-	-	-	N/A
1F Off Circ	-	-	-	1.6	-	-	-	-	-	-	-	N/A
WC Acc 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Open Off2 1F (DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
Open Off2 1F (Non DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
Reception GF	NO
GF Stair	NO
1F Off Stair	NO
WC Female 1F	NO
WC Male 1F	NO
Open Off1 1F (DL)	NO
Open Off1 1F (Non DL)	NO
GF Acc_Shww	NO
1F Off Circ	NO
1F Landing	NO
WC Acc 1F	NO
Open Off2 1F (DL)	NO
Open Off2 1F (Non DL)	NO

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
	Standard value	60	60	22
Reception GF	-	100	22	138
GF Stair	-	90	-	32
Warehouse	120	-	-	2285
1F Off Stair	-	90	-	34
WC Female 1F	-	90	-	23
WC Male 1F	-	90	-	23
Open Off1 1F (DL)	100	-	-	268
Open Off1 1F (Non DL)	100	-	-	397
Warehouse (Office undercroft)	120	-	-	523
GF Acc_Shww	-	90	-	53
1F Off Circ	-	90	-	18
1F Landing	-	90	-	27
WC Acc 1F	-	90	-	24

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
Open Off2 1F (DL)		100	-	-	127
Open Off2 1F (Non DL)		100	-	-	98

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?
Reception GF	NO (-43%)	NO
Warehouse	NO (-36%)	NO
Open Off1 1F (DL)	NO (-32%)	NO
Open Off1 1F (Non DL)	NO (-89%)	NO
Warehouse (Office undercroft)	NO (-37%)	NO
1F Off Circ	NO (-96%)	NO
Open Off2 1F (DL)	NO (-40%)	NO
Open Off2 1F (Non DL)	NO (-93%)	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?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Area [m ²]	963	963		A1/A2 Retail/Financial and Professional services
External area [m ²]	2164	2164		A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	SWI	SWI	100	B1 Offices and Workshop businesses
Infiltration [m ³ /hm ² @ 50Pa]	3	7		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	778	731		B8 Storage or Distribution
Average U-value [W/m ² K]	0.36	0.34		C1 Hotels
Alpha value* [%]	3.79	3.79		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

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	3.18	4.83
Cooling	1.16	1.38
Auxiliary	1.56	1.05
Lighting	8.47	14.98
Hot water	10.51	11.22
Equipment*	20.71	20.71
TOTAL**	24.88	33.46

* 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	7.04	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	33.77	41.83
Primary energy* [kWh/m ²]	76.39	72.24
Total emissions [kg/m ²]	9.3	14.2

* 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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Other local room heater - unfanned, [HS] LTHW boiler, [HFT] Electricity, [CFT] Electricity									
Actual	141.6	0	39.3	0	0	1	0	1	0
Notional	146.2	0	49.6	0	0	0.82	0	----	----
[ST] Other local room heater - unfanned, [HS] Room heater, [HFT] Electricity, [CFT] Electricity									
Actual	161.8	0	45	0	17.7	1	0	1	0
Notional	292.8	0	99.3	0	21.3	0.82	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	52.3	73.3	4.2	5.8	6.2	3.5	3.5	3.5	3.5
Notional	59.7	94	6.8	7.3	3.6	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-Typ}	U _{I-Min}	Surface where the minimum value occurs*
Wall	0.23	0.35	External Wall
Floor	0.2	0.25	Ground Floor
Roof	0.15	0.16	Roof
Windows, roof windows, and rooflights	1.5	1.3	Rooflight 4x1
Personnel doors	1.5	-	No personal doors in project
Vehicle access & similar large doors	1.5	1.5	Level Access Door
High usage entrance doors	1.5	-	No high usage entrance doors in project
U _{I-Typ} = Typical individual element U-values [W/(m ² K)]		U _{I-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	3

Unit H

BRUKL Output Document



Compliance with England Building Regulations Part L 2013

Project name

Shell and Core

22-205 Bicester Gateway, Unit H

FOR PLANNING

Date: Fri Jun 24 16:24:50 2022

Administrative information

Building Details

Address: 22-205 Bicester Gateway, Unit H, ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.2"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.2

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

Certifier details

Name:

Telephone number:

Address: , ,

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	14.1
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	14.1
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	9.2
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 -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.35	0.35	External Wall
Floor	0.25	0.25	0.25	Ground Floor
Roof	0.25	0.16	0.16	Roof
Windows***, roof windows, and rooflights	2.2	1.38	1.4	Ware wall light GF
Personnel doors	2.2	-	-	No personal doors in project
Vehicle access & similar large doors	1.5	1.5	1.5	Level Access Door
High usage entrance doors	3.5	-	-	No high usage entrance doors in project
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* 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	3

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	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- EPH Nat Vent

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	0.91*	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. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- EPH Extract only (4 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	0.91*	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. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

3- VRF (Occupied Areas) (6 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.5	-	-	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- Elec DHW with storage

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.01
Standard value	1	N/A

2- Elec Shw

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0
Standard value	1	N/A

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	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Reception GF	-	-	-	1.6	-	-	-	-	-	-	-	N/A
WC Female 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
WC Male 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Open Off1 1F (DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
Open Off1 1F (Non DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
GF Acc_Shww	-	-	0.5	-	-	-	-	-	-	-	-	N/A
1F Off Circ	-	-	-	1.6	-	-	-	-	-	-	-	N/A
WC Acc 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Open Off2 1F (DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
Open Off2 1F (Non DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
Reception GF	NO
GF Stair	NO
1F Off Stair	NO
WC Female 1F	NO
WC Male 1F	NO
Open Off1 1F (DL)	NO
Open Off1 1F (Non DL)	NO
GF Acc_Shww	NO
1F Off Circ	NO
1F Landing	NO
WC Acc 1F	NO
Open Off2 1F (DL)	NO
Open Off2 1F (Non DL)	NO

General lighting and display lighting

Zone name	Standard value	Luminous efficacy [lm/W]			General lighting [W]
		Luminaire	Lamp	Display lamp	
Reception GF	-	60	100	22	138
GF Stair	-	-	90	-	32
Warehouse	120	-	-	-	2274
1F Off Stair	-	-	90	-	34
WC Female 1F	-	-	90	-	23
WC Male 1F	-	-	90	-	24
Open Off1 1F (DL)	100	-	-	-	266
Open Off1 1F (Non DL)	100	-	-	-	398
Warehouse (Office undercroft)	120	-	-	-	526
GF Acc_Shww	-	-	90	-	53
1F Off Circ	-	-	90	-	18
1F Landing	-	-	90	-	28
WC Acc 1F	-	-	90	-	24

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
Open Off2 1F (DL)		100	-	-	128
Open Off2 1F (Non DL)		100	-	-	100

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?
Reception GF	NO (-34%)	NO
Warehouse	NO (-35%)	NO
Open Off1 1F (DL)	NO (-41%)	NO
Open Off1 1F (Non DL)	NO (-91%)	NO
Warehouse (Office undercroft)	NO (-21%)	NO
1F Off Circ	NO (-92%)	NO
Open Off2 1F (DL)	NO (-47%)	NO
Open Off2 1F (Non DL)	NO (-91%)	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?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Area [m ²]	962	962		A1/A2 Retail/Financial and Professional services
External area [m ²]	2158	2158		A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	SWI	SWI	100	B1 Offices and Workshop businesses
Infiltration [m ³ /hm ² @ 50Pa]	3	7		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	779	729		B8 Storage or Distribution
Average U-value [W/m ² K]	0.36	0.34		C1 Hotels
Alpha value* [%]	3.73	3.73		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

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	2.76	4.33
Cooling	1.47	1.65
Auxiliary	1.56	1.05
Lighting	8.37	14.85
Hot water	10.68	11.41
Equipment*	20.72	20.72
TOTAL**	24.85	33.29

* 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	7.05	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	34.99	42.62
Primary energy* [kWh/m ²]	76.28	71.91
Total emissions [kg/m ²]	9.2	14.1

* 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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Other local room heater - unfanned, [HS] LTHW boiler, [HFT] Electricity, [CFT] Electricity									
Actual	117.4	0	32.6	0	0	1	0	1	0
Notional	121.7	0	41.3	0	0	0.82	0	----	----
[ST] Other local room heater - unfanned, [HS] Room heater, [HFT] Electricity, [CFT] Electricity									
Actual	150.8	0	41.9	0	17.2	1	0	1	0
Notional	286.1	0	97.1	0	20.7	0.82	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	44.1	92.8	3.5	7.4	6.2	3.5	3.5	3.5	3.5
Notional	49.6	112.3	5.7	8.7	3.6	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-Typ}	U _{I-Min}	Surface where the minimum value occurs*
Wall	0.23	0.35	External Wall
Floor	0.2	0.25	Ground Floor
Roof	0.15	0.16	Roof
Windows, roof windows, and rooflights	1.5	1.3	Rooflight 4x1
Personnel doors	1.5	-	No personal doors in project
Vehicle access & similar large doors	1.5	1.5	Level Access Door
High usage entrance doors	1.5	-	No high usage entrance doors in project
U _{I-Typ} = Typical individual element U-values [W/(m ² K)]		U _{I-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	3

Unit J

BRUKL Output Document



Compliance with England Building Regulations Part L 2013

Project name

Shell and Core

22-205 Bicester Gateway, Unit J

FOR PLANNING

Date: Fri Jun 24 16:45:41 2022

Administrative Information

Building Details

Address: 22-205 Bicester Gateway, Unit J, ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.2"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.2

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

Certifier details

Name:

Telephone number:

Address: , ,

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	14.1
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	14.1
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	9.2
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 -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.35	0.35	External Wall
Floor	0.25	0.25	0.25	Ground Floor
Roof	0.25	0.16	0.16	Roof
Windows***, roof windows, and rooflights	2.2	1.38	1.4	Ware wall light GF
Personnel doors	2.2	-	-	No personal doors in project
Vehicle access & similar large doors	1.5	1.5	1.5	Level Access Door
High usage entrance doors	3.5	-	-	No high usage entrance doors in project
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* 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	3

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	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- EPH Nat Vent

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	0.91*	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. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- EPH Extract only (4 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	0.91*	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. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

3- VRF (Occupied Areas) (6 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.5	-	-	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- Elec DHW with storage

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.01
Standard value	1	N/A

2- Elec Shw

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0
Standard value	1	N/A

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	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Reception GF	-	-	-	1.6	-	-	-	-	-	-	-	N/A
WC Female 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
WC Male 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Open Off1 1F (DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
Open Off1 1F (Non DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
GF Acc_Shwh	-	-	0.5	-	-	-	-	-	-	-	-	N/A
1F Off Circ	-	-	-	1.6	-	-	-	-	-	-	-	N/A
WC Acc 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Open Off2 1F (DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
Open Off2 1F (Non DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
Reception GF	NO
GF Stair	NO
1F Off Stair	NO
WC Female 1F	NO
WC Male 1F	NO
Open Off1 1F (DL)	NO
Open Off1 1F (Non DL)	NO
GF Acc_Shwh	NO
1F Off Circ	NO
1F Landing	NO
WC Acc 1F	NO
Open Off2 1F (DL)	NO
Open Off2 1F (Non DL)	NO

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
	Standard value	60	60	22
Reception GF	-	100	22	137
GF Stair	-	90	-	32
Warehouse	120	-	-	2277
1F Off Stair	-	90	-	34
WC Female 1F	-	90	-	23
WC Male 1F	-	90	-	23
Open Off1 1F (DL)	100	-	-	268
Open Off1 1F (Non DL)	100	-	-	401
Warehouse (Office undercroft)	120	-	-	529
GF Acc_Shwh	-	90	-	53
1F Off Circ	-	90	-	18
1F Landing	-	90	-	27
WC Acc 1F	-	90	-	25

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
Open Off2 1F (DL)	100	-	-	-	126
Open Off2 1F (Non DL)	100	-	-	-	102

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?
Reception GF	NO (-27%)	NO
Warehouse	NO (-31%)	NO
Open Off1 1F (DL)	NO (-39%)	NO
Open Off1 1F (Non DL)	NO (-91%)	NO
Warehouse (Office undercroft)	NO (-21%)	NO
1F Off Circ	NO (-96%)	NO
Open Off2 1F (DL)	NO (-37%)	NO
Open Off2 1F (Non DL)	NO (-93%)	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?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	963	963
External area [m ²]	2161	2161
Weather	SWI	SWI
Infiltration [m ³ /hm ² @ 50Pa]	3	7
Average conductance [W/K]	781	730
Average U-value [W/m ² K]	0.36	0.34
Alpha value* [%]	3.75	3.75

* 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/m²]

	Actual	Notional
Heating	2.65	4.1
Cooling	1.61	1.85
Auxiliary	1.56	1.05
Lighting	8.37	14.86
Hot water	10.53	11.25
Equipment*	20.74	20.74
TOTAL**	24.73	33.1

* 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	7.04	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	35.96	44.24
Primary energy* [kWh/m ²]	75.93	71.98
Total emissions [kg/m ²]	9.2	14.1

* 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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Other local room heater - unfanned, [HS] LTHW boiler, [HFT] Electricity, [CFT] Electricity									
Actual	116.7	0	32.4	0	0	1	0	1	0
Notional	116.9	0	39.7	0	0	0.82	0	----	----
[ST] Other local room heater - unfanned, [HS] Room heater, [HFT] Electricity, [CFT] Electricity									
Actual	147.3	0	40.9	0	17.3	1	0	1	0
Notional	277.4	0	94.1	0	20.8	0.82	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	41.5	101.3	3.3	8	6.2	3.5	3.5	3.5	3.5
Notional	46.7	125.8	5.3	9.7	3.6	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-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.35	External Wall
Floor	0.2	0.25	Ground Floor
Roof	0.15	0.16	Roof
Windows, roof windows, and rooflights	1.5	1.3	Rooflight 4x1
Personnel doors	1.5	-	No personal doors in project
Vehicle access & similar large doors	1.5	1.5	Level Access Door
High usage entrance doors	1.5	-	No high usage entrance doors in project
U _{i-Typ} = Typical individual element U-values [W/(m ² K)]		U _{i-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	3

Unit K

BRUKL Output Document



Compliance with England Building Regulations Part L 2013

Project name

Shell and Core

22-205 Bicester Gateway, Unit K

FOR PLANNING

Date: Fri Jun 24 17:01:57 2022

Administrative information

Building Details

Address: 22-205 Bicester Gateway, Unit K, ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.2"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.2

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

Certifier details

Name:

Telephone number:

Address: , ,

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	14.1
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	14.1
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	9.2
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 -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.35	0.35	External Wall
Floor	0.25	0.25	0.25	Ground Floor
Roof	0.25	0.16	0.16	Roof
Windows***, roof windows, and rooflights	2.2	1.37	1.4	Ware wall light GF
Personnel doors	2.2	-	-	No personal doors in project
Vehicle access & similar large doors	1.5	1.5	1.5	Level Access Door
High usage entrance doors	3.5	-	-	No high usage entrance doors in project
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* 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	3

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	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- EPH Nat Vent

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	0.91*	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. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- EPH Extract only (4 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	0.91*	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. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

3- VRF (Occupied Areas) (6 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.5	-	-	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- Elec DHW with storage

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.01
Standard value	1	N/A

2- Elec Shw

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0
Standard value	1	N/A

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	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Reception GF	-	-	-	1.6	-	-	-	-	-	-	-	N/A
WC Female 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
WC Male 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Open Off1 1F (DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
Open Off1 1F (Non DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
GF Acc_Shww	-	-	0.5	-	-	-	-	-	-	-	-	N/A
1F Off Circ	-	-	-	1.6	-	-	-	-	-	-	-	N/A
WC Acc 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Open Off2 1F (DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
Open Off2 1F (Non DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
Reception GF	NO
GF Stair	NO
1F Off Stair	NO
WC Female 1F	NO
WC Male 1F	NO
Open Off1 1F (DL)	NO
Open Off1 1F (Non DL)	NO
GF Acc_Shww	NO
1F Off Circ	NO
1F Landing	NO
WC Acc 1F	NO
Open Off2 1F (DL)	NO
Open Off2 1F (Non DL)	NO

General lighting and display lighting

Zone name	Standard value	Luminous efficacy [lm/W]			General lighting [W]
		Luminaire	Lamp	Display lamp	
		60	60	22	
Reception GF	-	-	100	22	133
GF Stair	-	-	90	-	35
Warehouse	120	-	-	-	2288
1F Off Stair	-	-	90	-	35
WC Female 1F	-	-	90	-	23
WC Male 1F	-	-	90	-	23
Open Off1 1F (DL)	-	100	-	-	269
Open Off1 1F (Non DL)	-	100	-	-	399
Warehouse (Office undercroft)	120	-	-	-	526
GF Acc_Shww	-	-	90	-	52
1F Off Circ	-	-	90	-	18
1F Landing	-	-	90	-	26
WC Acc 1F	-	-	90	-	24

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
		60	60	22	
Open Off2 1F (DL)		100	-	-	127
Open Off2 1F (Non DL)		100	-	-	99

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?
Reception GF	NO (-39%)	NO
Warehouse	NO (-32%)	NO
Open Off1 1F (DL)	NO (-32%)	NO
Open Off1 1F (Non DL)	NO (-89%)	NO
Warehouse (Office undercroft)	NO (-38%)	NO
1F Off Circ	NO (-94%)	NO
Open Off2 1F (DL)	NO (-32%)	NO
Open Off2 1F (Non DL)	NO (-89%)	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?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Area [m ²]	964	964		A1/A2 Retail/Financial and Professional services
External area [m ²]	2167	2167		A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	SWI	SWI	100	B1 Offices and Workshop businesses
Infiltration [m ³ /hm ² @ 50Pa]	3	7		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	776	732		B8 Storage or Distribution
Average U-value [W/m ² K]	0.36	0.34		C1 Hotels
Alpha value* [%]	3.79	3.79		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

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	3.03	4.72
Cooling	1.55	1.66
Auxiliary	1.55	1.05
Lighting	8.41	14.82
Hot water	10.16	10.84
Equipment*	20.73	20.73
TOTAL**	24.7	33.08

* 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/m²]

	Actual	Notional
Photovoltaic systems	7.04	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	37.62	44.82
Primary energy* [kWh/m ²]	75.82	71.9
Total emissions [kg/m ²]	9.2	14.1

* 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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Other local room heater - unfanned, [HS] LTHW boiler, [HFT] Electricity, [CFT] Electricity									
Actual	136.4	0	37.9	0	0	1	0	1	0
Notional	143	0	48.5	0	0	0.82	0	----	----
[ST] Other local room heater - unfanned, [HS] Room heater, [HFT] Electricity, [CFT] Electricity									
Actual	159.2	0	44.2	0	18.2	1	0	1	0
Notional	302.6	0	102.6	0	21.8	0.82	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	48.8	98.4	3.9	7.8	6.2	3.5	3.5	3.5	3.5
Notional	55.9	114.1	6.4	8.8	3.6	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-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.35	External Wall
Floor	0.2	0.25	Ground Floor
Roof	0.15	0.16	Roof
Windows, roof windows, and rooflights	1.5	1.3	Rooflight 4x1
Personnel doors	1.5	-	No personal doors in project
Vehicle access & similar large doors	1.5	1.5	Level Access Door
High usage entrance doors	1.5	-	No high usage entrance doors in project
U _{i-Typ} = Typical individual element U-values [W/(m ² K)]		U _{i-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	3

Unit L

BRUKL Output Document



Compliance with England Building Regulations Part L 2013

Project name

Shell and Core

22-205 Bicester Gateway, Unit L

FOR PLANNING

Date: Wed Jun 29 10:28:07 2022

Administrative Information

Building Details

Address: 22-205 Bicester Gateway, Unit L, ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.2"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.2

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

Certifier details

Name:

Telephone number:

Address: , ,

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	13.5
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	13.5
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	8.6
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 -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.35	0.35	External Wall
Floor	0.25	0.25	0.25	Ground Floor
Roof	0.25	0.16	0.16	Roof
Windows***, roof windows, and rooflights	2.2	1.37	1.4	Ware wall light GF
Personnel doors	2.2	-	-	No personal doors in project
Vehicle access & similar large doors	1.5	1.5	1.5	Level Access Door
High usage entrance doors	3.5	-	-	No high usage entrance doors in project
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* 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	3

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	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- EPH Nat Vent

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	0.91*	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. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

2- EPH Extract only (4 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	0.91*	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. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.					

3- VRF (Occupied Areas) (6 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.5	-	-	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- Elec DHW with storage

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.01
Standard value	1	N/A

2- Elec Shw

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0
Standard value	1	N/A

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	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Reception GF	-	-	-	1.6	-	-	-	-	-	-	-	N/A
WC Female 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
WC Male 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Open Off1 1F (DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
Open Off1 1F (Non DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
GF Acc_Shw	-	-	0.5	-	-	-	-	-	-	-	-	N/A
1F Off Circ	-	-	-	1.6	-	-	-	-	-	-	-	N/A
WC Acc 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Open Off2 1F (DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
Open Off2 1F (Non DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
Reception GF	NO
GF Stair	NO
1F Off Stair	NO
WC Female 1F	NO
WC Male 1F	NO
Open Off1 1F (DL)	NO
Open Off1 1F (Non DL)	NO
GF Acc_Shw	NO
1F Off Circ	NO
1F Landing	NO
WC Acc 1F	NO
Open Off2 1F (DL)	NO
Open Off2 1F (Non DL)	NO

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
	Standard value	60	60	22
Reception GF	-	100	22	135
GF Stair	-	90	-	34
Warehouse	120	-	-	2591
1F Off Stair	-	90	-	36
WC Female 1F	-	90	-	22
WC Male 1F	-	90	-	22
Open Off1 1F (DL)	100	-	-	239
Open Off1 1F (Non DL)	100	-	-	492
Warehouse (Office undercroft)	120	-	-	593
GF Acc_Shw	-	90	-	53
1F Off Circ	-	90	-	21
1F Landing	-	90	-	26
WC Acc 1F	-	90	-	23

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
Open Off2 1F (DL)		100	-	-	129
Open Off2 1F (Non DL)		100	-	-	125

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?
Reception GF	NO (-43%)	NO
Warehouse	NO (-9%)	NO
Open Off1 1F (DL)	NO (-54%)	NO
Open Off1 1F (Non DL)	NO (-76%)	NO
Warehouse (Office undercroft)	NO (-36%)	NO
1F Off Circ	NO (-96%)	NO
Open Off2 1F (DL)	NO (-41%)	NO
Open Off2 1F (Non DL)	NO (-94%)	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?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Area [m ²]	1086	1086		A1/A2 Retail/Financial and Professional services
External area [m ²]	2801	2801		A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	SWI	SWI	100	B1 Offices and Workshop businesses
Infiltration [m ³ /hm ² @ 50Pa]	3	7		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	1057	927		B8 Storage or Distribution
Average U-value [W/m ² K]	0.38	0.33		C1 Hotels
Alpha value* [%]	4.45	4.45		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

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	3.06	4.91
Cooling	1.08	1.37
Auxiliary	1.49	0.99
Lighting	7.78	14.32
Hot water	9.5	10.13
Equipment*	20.69	20.69
TOTAL**	22.9	31.72

* 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	6.25	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	32.83	43.09
Primary energy* [kWh/m ²]	70.3	69.29
Total emissions [kg/m ²]	8.6	13.5

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

HVAC Systems Performance									
System Type	Heat dem MJ/m ²	Cool dem MJ/m ²	Heat con kWh/m ²	Cool con kWh/m ²	Aux con kWh/m ²	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Other local room heater - unfanned, [HS] LTHW boiler, [HFT] Electricity, [CFT] Electricity									
Actual	145.3	0	40.4	0	0	1	0	1	0
Notional	154.1	0	52.3	0	0	0.82	0	----	----
[ST] Other local room heater - unfanned, [HS] Room heater, [HFT] Electricity, [CFT] Electricity									
Actual	169.2	0	47	0	18.3	1	0	1	0
Notional	333.4	0	113.1	0	21.9	0.82	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	58	70	4.6	5.6	6.2	3.5	3.5	3.5	3.5
Notional	70.3	96.5	8	7.5	3.6	2.43	3.6	----	----

Key to terms

Heat dem [MJ/m ²]	= Heating energy demand
Cool dem [MJ/m ²]	= Cooling energy demand
Heat con [kWh/m ²]	= Heating energy consumption
Cool con [kWh/m ²]	= Cooling energy consumption
Aux con [kWh/m ²]	= 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-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.35	External Wall
Floor	0.2	0.25	Ground Floor
Roof	0.15	0.16	Roof
Windows, roof windows, and rooflights	1.5	1.3	Rooflight 7 x 1
Personnel doors	1.5	-	No personal doors in project
Vehicle access & similar large doors	1.5	1.5	Level Access Door
High usage entrance doors	1.5	-	No high usage entrance doors in project
U _{i-Typ} = Typical individual element U-values [W/(m ² K)]		U _{i-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	3

Unit M

BRUKL Output Document



Compliance with England Building Regulations Part L 2013

Project name

Shell and Core

22-205 Bicester Gateway, Unit M

FOR PLANNING

Date: Wed Jun 29 15:21:11 2022

Administrative information

Building Details

Address: 22-205 Bicester Gateway, Unit M, ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.2"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.2

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

Certifier details

Name:

Telephone number:

Address: , ,

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	13.1
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	13.1
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	8
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 -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.35	0.35	External Wall
Floor	0.25	0.25	0.25	Ground Floor
Roof	0.25	0.16	0.16	Roof
Windows***, roof windows, and rooflights	2.2	1.38	1.4	Ware wall light GF
Personnel doors	2.2	-	-	No personal doors in project
Vehicle access & similar large doors	1.5	1.5	1.5	Level Access Door
High usage entrance doors	3.5	-	-	No high usage entrance doors in project
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* 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	3

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	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- EPH Nat Vent

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	0.91*	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. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.

2- EPH Extract only (4 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	0.91*	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. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.

3- VRF (Occupied Areas) (6 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.5	-	-	0.7
Standard value	2.5*	2.6	N/A	N/A	0.5
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. For types <=12 kW output, refer to EN 14825 for limiting standards.

1- Elec DHW with storage

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0.01
Standard value	1	N/A

2- Elec Shw

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0
Standard value	1	N/A

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	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Reception GF	-	-	-	1.6	-	-	-	-	-	-	-	N/A
WC Female 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
WC Male 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Open Off1 1F (DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
Open Off1 1F (Non DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
GF Acc_Shww	-	-	0.5	-	-	-	-	-	-	-	-	N/A
1F Off Circ	-	-	-	1.6	-	-	-	-	-	-	-	N/A
WC Acc 1F	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Open Off2 1F (DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A
Open Off2 1F (Non DL)	-	-	-	1.6	-	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
Reception GF	NO
GF Stair	NO
1F Off Stair	NO
WC Female 1F	NO
WC Male 1F	NO
Open Off1 1F (DL)	NO
Open Off1 1F (Non DL)	NO
GF Acc_Shww	NO
1F Off Circ	NO
1F Landing	NO
WC Acc 1F	NO
Open Off2 1F (DL)	NO
Open Off2 1F (Non DL)	NO

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
	Standard value	60	60	22
Reception GF	-	100	22	137
GF Stair	-	90	-	33
Warehouse	120	-	-	2583
1F Off Stair	-	90	-	34
WC Female 1F	-	90	-	23
WC Male 1F	-	90	-	23
Open Off1 1F (DL)	100	-	-	325
Open Off1 1F (Non DL)	100	-	-	542
Warehouse (Office undercroft)	120	-	-	682
GF Acc_Shww	-	90	-	51
1F Off Circ	-	90	-	22
1F Landing	-	90	-	28
WC Acc 1F	-	90	-	24

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
Open Off2 1F (DL)		100	-	-	128
Open Off2 1F (Non DL)		100	-	-	129

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?
Reception GF	NO (-58%)	NO
Warehouse	NO (-9%)	NO
Open Off1 1F (DL)	NO (-69%)	NO
Open Off1 1F (Non DL)	NO (-91%)	NO
Warehouse (Office undercroft)	NO (-56%)	NO
1F Off Circ	NO (-95%)	NO
Open Off2 1F (DL)	NO (-55%)	NO
Open Off2 1F (Non DL)	NO (-93%)	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?	YES
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Area [m ²]	1135	1135		A1/A2 Retail/Financial and Professional services
External area [m ²]	2843	2843		A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
Weather	SWI	SWI	100	B1 Offices and Workshop businesses
Infiltration [m ³ /hm ² @ 50Pa]	3	7		B2 to B7 General Industrial and Special Industrial Groups
Average conductance [W/K]	1076	935		B8 Storage or Distribution
Average U-value [W/m ² K]	0.38	0.33		C1 Hotels
Alpha value* [%]	3.98	3.98		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

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	2.78	3.95
Cooling	1.11	1.68
Auxiliary	1.57	1.02
Lighting	7.7	14.77
Hot water	8.29	8.81
Equipment*	21.08	21.08
TOTAL**	21.44	30.24

* 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	5.98	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	31.61	42.26
Primary energy* [kWh/m ²]	65.82	68.53
Total emissions [kg/m ²]	8	13.1

* 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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Other local room heater - unfanned, [HS] LTHW boiler, [HFT] Electricity, [CFT] Electricity									
Actual	134.3	0	37.3	0	0	1	0	1	0
Notional	126.3	0	42.9	0	0	0.82	0	----	----
[ST] Other local room heater - unfanned, [HS] Room heater, [HFT] Electricity, [CFT] Electricity									
Actual	167.4	0	46.5	0	18.7	1	0	1	0
Notional	303.5	0	102.9	0	22.5	0.82	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	49.7	67.4	4	5.4	6.2	3.5	3.5	3.5	3.5
Notional	50.5	110.2	5.8	8.5	3.6	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-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.35	External Wall
Floor	0.2	0.25	Ground Floor
Roof	0.15	0.16	Roof
Windows, roof windows, and rooflights	1.5	1.3	Rooflight 7 x 1
Personnel doors	1.5	-	No personal doors in project
Vehicle access & similar large doors	1.5	1.5	Level Access Door
High usage entrance doors	1.5	-	No high usage entrance doors in project
U _{i-Typ} = Typical individual element U-values [W/(m ² K)]		U _{i-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	3