

Project name

Shell and Core

Unit G1

As built

Date: Fri Oct 21 08:42:09 2022

Administrative information

Building Details

Address: Unit G1, Rochdale, OL16 4UP

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.13

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.13

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

Certifier details

Name: Christos Papantoniou

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Address: 1 Russell Mews, Bristol, BS37 6BJ

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	28.6
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	28.6
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	25.6
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	0.24	0.24	NT000002:Surf[1]
Floor	0.25	0.2	0.2	NT000000:Surf[0]
Roof	0.25	0.17	0.17	NT000002:Surf[25]
Windows***, roof windows, and rooflights	2.2	1.05	1.42	NT000003:Surf[5]
Personnel doors	2.2	1.8	1.8	NT000002:Surf[2]
Vehicle access & similar large doors	1.5	1.1	1.1	NT000002:Surf[6]
High usage entrance doors	3.5	-	-	No High usage entrance doors in building
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	1.68

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- Electric panel heaters with extract

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0	0	-
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- ASHP

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.5	0	0	-
Standard value	2.5*	2.6	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- Electric panel heaters

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	0	0	-
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

4- ASHP (MVHR)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	3.5	0	0	0.8
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- Instantaneous hot water only

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
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		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
Unit 1_GF_Cleaners cupboard	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 1_GF_WC	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 1_1F_WCs	0.3	-	-	-	-	-	-	-	-	-	N/A
Unit 1_1F_Kitchenette	-	-	-	1.1	-	-	-	-	-	-	N/A
Unit 1_1F_Office	-	-	-	1.1	-	-	-	-	-	-	N/A

Shell and core configuration

Zone	Excluded from calculation?
Unit 1_GF_Cleaners cupboard	NO
Unit 1_GF_WC	NO
Unit 1_GF_Warehouse	YES
Unit 1_1F_Circulation	NO
Unit 1_1F_WCs	NO
Unit 1_1F_Kitchenette	NO
Unit 1_1F_Office	NO
Unit 1_GF_Entrance	NO

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
Standard value	60	60	22	
Unit 1_GF_Cleaners cupboard	80	-	-	13
Unit 1_GF_WC	-	80	-	47
Unit 1_GF_Warehouse	60	-	-	13445
Unit 1_1F_Circulation	-	80	-	86
Unit 1_1F_WCs	-	80	-	150
Unit 1_1F_Kitchenette	80	-	-	69
Unit 1_1F_Office	100	-	-	644
Unit 1_GF_Entrance	-	80	-	97

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?
Unit 1_GF_Warehouse	NO (-37.8%)	NO
Unit 1_1F_Kitchenette	NO (-89.7%)	NO
Unit 1_1F_Office	NO (-63.2%)	NO
Unit 1_GF_Entrance	NO (-67.5%)	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?	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
Area [m ²]	204.7	204.7
External area [m ²]	5337.5	5337.5
Weather	MAN	MAN
Infiltration [m ³ /hm ² @ 50Pa]	2	7
Average conductance [W/K]	1365.23	1698.84
Average U-value [W/m ² K]	0.26	0.32
Alpha value* [%]	10	10

* 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
	B1 Offices and Workshop businesses
	B2 to B7 General Industrial and Special Industrial Groups
100	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	23.41	30.39
Cooling	4.4	4.65
Auxiliary	5.06	5.32
Lighting	14.24	21.64
Hot water	2.25	2.47
Equipment*	27.93	27.93
TOTAL **	49.36	64.47

* 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	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]	173.29	228.31
Primary energy* [kWh/m ²]	151.54	152.66
Total emissions [kg/m ²]	25.6	28.6

* 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 SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
Actual	172	40.9	14.6	4.2	0	3.26	2.7	3.5	3.8	
Notional	185.3	90.6	20.1	6.6	0	2.56	3.79	----	----	
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
Actual	166.7	0	57.9	0	0	0.8	0	1	0	
Notional	214.8	0	69.2	0	0	0.86	0	----	----	
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
Actual	144	0	50	0	18.5	0.8	0	1	0	
Notional	172.3	0	55.5	0	23.4	0.86	0	----	----	
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
Actual	97.1	70.2	8.3	7.2	4.6	3.26	2.7	3.5	3.8	
Notional	138.4	91	15	6.7	3.6	2.56	3.79	----	----	

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	0.23	NT000004:Surf[1]
Floor	0.2	0.2	NT000000:Surf[0]
Roof	0.15	0.17	NT000002:Surf[25]
Windows, roof windows, and rooflights	1.5	1	NT000002:Surf[13]
Personnel doors	1.5	1.8	NT000002:Surf[2]
Vehicle access & similar large doors	1.5	1.1	NT000002:Surf[6]
High usage entrance doors	1.5	-	No High usage entrance doors in building
U _{i-Typ} = Typical individual element U-values [W/(m²K)]			U _{i-Min} = Minimum individual element U-values [W/(m²K)]
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	1.68