

Project name

Shell and Core

Hayes

As designed

Date: Tue Nov 22 11:22:38 2022

Administrative information

Building Details

Address: Bridgewater Retail Park, Hayes, London, N17 0RU

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.6.b.0

Interface to calculation engine: Energy Simulator

Interface to calculation engine version: 10.9.2.36

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

Certifier details

Name: Carlton Garratt

Telephone number: 01384 397777

Address: Briar, Capstan House, Brierley Hill, DY5 1XL

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	7.7
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	0.26	0.26	"Partition 1"
Floor	0.25	0.11	0.11	"Exposed Floor 1"
Roof	0.25	0.16	0.16	"Exposed Roof 1"
Windows***, roof windows, and rooflights	2.2	1.31	1.31	"Window 1"
Personnel doors	2.2	-	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	1.3	1.3	"Door 1 (Vehicle Access Door)"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"
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	2.06

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	>0.95

1- HVAC for zone Toilets and Kitchen Areas

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.95	-	-	-	-
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- HVAC for zone Staircases + Corridors

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.95	-	-	-	-
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

3- HVAC for zone Offices

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.95	-	-	-	-
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.					

4- HVAC for zone Warehouse Office

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.95	-	-	-	-
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.					

1- POU

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
Standard value	0.9*	N/A
* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.		

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	
0.03 Acc WC & Shower	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
1.03 Acc.WC	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
1.04 Female WC	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
1.05 Male WC	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
1.06 Kitchen/Breakout	-	-	0.3	-	-	-	-	-	-	-	N/A	
2.03 Acc.WC	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
2.04 Female WC	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
2.05 Male WC	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
2.06 Kitchen/Breakout	-	-	0.3	-	-	-	-	-	-	-	N/A	
0.07 Cleaners Store	-	-	1.1	-	-	-	-	-	-	-	N/A	
0.08 Shower	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
0.09 WC	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
0.10 Acc WC	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
1.10 Cleaners Cupboard	-	-	0.3	-	-	-	-	-	-	-	N/A	
1.11 Unisex WC	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
1.12 Unisex WC	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
1.02 Meeting Room	1.1	-	-	1.1	-	-	-	-	-	0.75	0.5	
1.07 Open Plan Office	1.1	-	-	1.1	-	-	-	-	-	0.75	0.5	
2.07 Open Plan Office	1.1	-	-	1.1	-	-	-	-	-	0.75	0.5	
0.05 Drivers Lounge	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
0.06 Open Plan Office (DRIVERS)	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
1.09 Open Plan Office (DRIVERS)	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
2.02 Conference Room	-	-	1.1	1.1	-	-	-	-	-	0.75	0.5	
0.04 Warehouse Office	0.9	0.9	-	-	-	-	-	-	-	-	N/A	

Shell and core configuration

Zone	Assumed shell?
0.03 Acc WC & Shower	NO
1.03 Acc.WC	NO
1.04 Female WC	NO
1.05 Male WC	NO
1.06 Kitchen/Breakout	NO
2.03 Acc.WC	NO
2.04 Female WC	NO
2.05 Male WC	NO
2.06 Kitchen/Breakout	NO
0.07 Cleaners Store	NO
0.08 Shower	NO
0.09 WC	NO
0.10 Acc WC	NO
1.10 Cleaners Cupboard	NO
1.11 Unisex WC	NO
1.12 Unisex WC	NO
0.02 Reception	NO
Staircase (EAST)	NO

Shell and core configuration

Zone	Assumed shell?
Staircase (WEST)	NO
1.01 Corridor/Lobby	NO
Staircase (DRIVERS LOUNGE)	NO
2.01 Corridor	NO
1.02 Meeting Room	NO
1.07 Open Plan Office	NO
2.07 Open Plan Office	NO
0.05 Drivers Lounge	NO
0.06 Open Plan Office (DRIVERS)	NO
1.09 Open Plan Office (DRIVERS)	NO
2.02 Conference Room	NO
0.01 Warehouse	NO
0.04 Warehouse Office	NO

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
		60	60	22	
0.03 Acc WC & Shower		-	156	-	49
1.03 Acc.WC		-	180	-	34
1.04 Female WC		-	130	-	112
1.05 Male WC		-	129	-	122
1.06 Kitchen/Breakout		60	-	-	386
2.03 Acc.WC		-	338	-	34
2.04 Female WC		-	254	-	112
2.05 Male WC		-	263	-	122
2.06 Kitchen/Breakout		100	-	-	386
0.07 Cleaners Store		130	-	-	13
0.08 Shower		-	257	-	17
0.09 WC		-	258	-	17
0.10 Acc WC		-	201	-	25
1.10 Cleaners Cupboard		110	-	-	16
1.11 Unisex WC		-	223	-	21
1.12 Unisex WC		-	221	-	21
0.02 Reception		-	153	15	303
Staircase (EAST)		-	602	-	51
Staircase (WEST)		-	451	-	63
1.01 Corridor/Lobby		-	166	-	203
Staircase (DRIVERS LOUNGE)		-	318	-	81
2.01 Corridor		-	451	-	108
1.02 Meeting Room		178	-	-	177
1.07 Open Plan Office		165	-	-	2409
2.07 Open Plan Office		163	-	-	2409
0.05 Drivers Lounge		188	-	-	115
0.06 Open Plan Office (DRIVERS)		173	-	-	355
1.09 Open Plan Office (DRIVERS)		173	-	-	484

General lighting and display lighting		Luminous efficacy [lm/W]		
Zone name		Luminaire	Lamp	Display lamp
	Standard value	60	60	22
2.02 Conference Room		240	-	-
0.01 Warehouse		442	-	-
0.04 Warehouse Office		89	-	-
				General lighting [W]
				302
				13347
				3606

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?
1.06 Kitchen/Breakout	NO (-56.1%)	YES
2.06 Kitchen/Breakout	NO (-82.6%)	YES
0.02 Reception	NO (-27.6%)	YES
1.02 Meeting Room	NO (-30.6%)	YES
1.07 Open Plan Office	NO (-83%)	YES
2.07 Open Plan Office	N/A	N/A
0.05 Drivers Lounge	N/A	N/A
0.06 Open Plan Office (DRIVERS)	NO (-59.5%)	YES
1.09 Open Plan Office (DRIVERS)	NO (-67.7%)	YES
2.02 Conference Room	NO (-72.3%)	YES
0.01 Warehouse	N/A	N/A
0.04 Warehouse Office	NO (-73.3%)	YES

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?	YES
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]	16083.1	16083.1
External area [m ²]	38159.4	38159.4
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	2	3
Average conductance [W/K]	6818.23	11236.5
Average U-value [W/m ² K]	0.18	0.29
Alpha value* [%]	5.63	20.81

* 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	2.58	3.82
Cooling	0	0
Auxiliary	3.33	1.67
Lighting	8.27	20.82
Hot water	4.19	4.85
Equipment*	31.22	31.22
TOTAL **	18.37	31.15

* 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]	176.54	258.03
Primary energy* [kWh/m ²]	45.4	77.64
Total emissions [kg/m ²]	7.7	13.5

* 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] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	44.5	135.6	14.6	0	16.9	0.85	0	0.95	0	
Notional	128.7	112	43.6	0	12.2	0.82	0	----	----	
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
Actual	246	193.3	89.9	0	0	0.76	0	0.95	0	
Notional	386.4	98.4	131.1	0	0	0.82	0	----	----	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	7.5	248.9	2.4	0	16.8	0.85	0	0.95	0	
Notional	37.2	215.5	12.6	0	8.9	0.82	0	----	----	
[ST] No Heating or Cooling										
Actual	83.8	77.5	0	0	0	0	0	0	0	
Notional	100	163.2	0	0	0	0	0	----	----	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	53.5	141.9	17.5	0	32.9	0.85	0	0.95	0	
Notional	2.7	99	0.9	0	14.5	0.82	0	----	----	

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

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	0.26	"Partition 1"
Floor	0.2	0.11	"Exposed Floor 1"
Roof	0.15	0.16	"Exposed Roof 1"
Windows, roof windows, and rooflights	1.5	1.31	"Window 1"
Personnel doors	1.5	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	1.3	"Door 1 (Vehicle Access Door)"
High usage entrance doors	1.5	-	"No external high usage entrance doors"
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	2.06