

Project name

Shell and Core

Stag Brewery-Building 1-Cinema-Green

As designed

Date: Thu Jan 20 21:07:37 2022

Administrative information

Building Details

Address: Address 1, City, Postcode

Owner Details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.12

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.12

BRUKL compliance check version: v5.6.a.1

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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	22.3
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	22.3
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	22.1
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	0.18	0.18	B2000000:Surf[1]
Floor	0.25	0.2	0.2	B2000000:Surf[0]
Roof	0.25	0.15	0.15	B1000001:Surf[0]
Windows***, roof windows, and rooflights	2.2	1.4	1.4	00000000:Surf[0]
Personnel doors	2.2	1.1	1.1	00000000:Surf[2]
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
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	5

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	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- Heating only

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.22	-	0.2	0	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

2- VRF

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.22	5.5	0	1.6	0.75
Standard value	2.5*	3.2	N/A	1.6^	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					
^ Limiting SFP may be extended by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.					

1- DWH

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.22	-
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

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	
	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			
B2-Cinema-Corridor	-	-	-	-	-	-	-	0.4	-	-	N/A	
B2-Cinema-Corridor	-	-	-	-	-	-	-	0.4	-	-	N/A	
B2-Cinema-Corridor	-	-	-	-	-	-	-	0.4	-	-	N/A	
B2-Cinema-Screen room	-	-	-	-	-	-	-	0.4	-	-	N/A	
B2-Cinema-Corridor	-	-	-	-	-	-	-	0.4	-	-	N/A	

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			
B2-Cinema-Escape corridor	-	-	-	-	-	-	-	0.4	-	-	-	N/A
B2-Cinema-Screenroom	-	-	-	-	-	-	-	0.4	-	-	-	N/A
B2-Cinema-Lift Lobby	-	-	-	-	-	-	-	0.4	-	-	-	N/A
B1-Cinema-Screen Room	-	-	-	-	-	-	-	0.4	-	-	-	N/A
B1-Cinema-Lift Lobby	-	-	-	-	-	-	-	0.4	-	-	-	N/A
B1-Cinema-Corridor	-	-	-	-	-	-	-	0.4	-	-	-	N/A
B1-Cinema-Projector Room	-	-	-	-	-	-	-	0.4	-	-	-	N/A
B1-Cinema-Screen Room	-	-	-	-	-	-	-	0.4	-	-	-	N/A
B1-Cinema-Corridor	-	-	-	-	-	-	-	0.4	-	-	-	N/A
B1-Cinema-Male WC	-	-	0.4	-	-	-	-	-	-	-	-	N/A
B1-Cinema-Female WC	-	-	0.4	-	-	-	-	-	-	-	-	N/A
B1-Cinema-Projection Room	-	-	-	-	-	-	-	0.4	-	-	-	N/A
B1-Cinema-Screen Room	-	-	-	-	-	-	-	0.4	-	-	-	N/A
B1-Cinema-Projection Room	-	-	-	-	-	-	-	0.4	-	-	-	N/A
B1-Cinema-Corridor	-	-	-	-	-	-	-	0.4	-	-	-	N/A
B1-Cinema-Foyer	-	-	-	-	-	-	-	0.4	-	-	-	N/A
00-Cinema-Corridor	-	-	-	-	-	-	-	0.4	-	-	-	N/A
00-Cinema-Screen Room	-	-	-	-	-	-	-	0.4	-	-	-	N/A
00-Cinema-Office	-	-	-	-	-	-	-	0.4	-	-	-	N/A
00-Cinema-Corridor	-	-	-	-	-	-	-	0.4	-	-	-	N/A
00-Cinema-Projection Room	-	-	-	-	-	-	-	0.4	-	-	-	N/A
00-Cinema-Foyer	-	-	-	-	-	-	-	0.4	-	-	-	N/A
00-Cinema-Dis WC	-	-	0.4	-	-	-	-	-	-	-	-	N/A
00-Cinema-Kitchen	-	-	-	-	-	-	-	0.4	0.4	-	-	N/A
00-Cinema-Cafe	-	-	-	-	-	-	-	0.4	-	-	-	N/A

Shell and core configuration

Zone	Assumed shell?
B2-Cinema-AHU Extract Riser	NO
B2-Cinema-Medium plant room	NO
B2-Cinema-Medium plant room	NO
B2-Cinema-Medium plant room	NO
B2-Cinema-Medium plant room	NO
B2-Cinema-Small cinema plant room	NO
B2-Cinema-Stairwell	NO
B2-Cinema-Tank Room	NO
B2-Cinema-Corridor	NO
B2-Cinema-Corridor	NO
B2-Cinema-Corridor	NO
B2-Cinema-Screen room	NO
B2-Cinema-Corridor	NO
B2-Cinema-Escape corridor	NO
B2-Cinema-Stairwell	NO
B2-Cinema-Screenroom	NO
B2-Cinema-Lift Lobby	NO

Shell and core configuration

Zone	Assumed shell?
B1-Cinema-Screen Room	NO
B1-Cinema-Stairwell	NO
B1-Cinema-Lift Lobby	NO
B1-Cinema-Stairwell	NO
B1-Cinema-Stairwell	NO
B1-Cinema-Corridor	NO
B1-Cinema-Projector Room	NO
B1-Cinema-LV Switch Room	NO
B1-Cinema-Screen Room	NO
B1-Cinema-Corridor	NO
B1-Cinema-Store	NO
B1-Cinema-LV Secondary Switch Room	NO
B1-Cinema-Male WC	NO
B1-Cinema-Female WC	NO
B1-Cinema-Projection Room	NO
B1-Cinema-Comms Room	NO
B1-Cinema-Screen Room	NO
B1-Cinema-Projection Room	NO
B1-Cinema-Corridor	NO
B1-Cinema-Store	NO
B1-Cinema-Foyer	NO
00-Cinema-Stairwell	NO
00-Cinema-Stairwell	NO
00-Cinema-Corridor	NO
00-Cinema-Screen Room	NO
00-Cinema-Office	NO
00-Cinema-Corridor	NO
00-Cinema-Projection Room	NO
00-Cinema-Foyer	NO
00-Cinema-Dis WC	NO
00-Cinema-Kitchen	NO
00-Cinema-Cafe	NO

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
Standard value	60	60	22	
B2-Cinema-AHU Extract Riser	80	-	-	80
B2-Cinema-Medium plant room	80	-	-	61
B2-Cinema-Medium plant room	80	-	-	108
B2-Cinema-Medium plant room	80	-	-	122
B2-Cinema-Medium plant room	80	-	-	99
B2-Cinema-Small cinema plant room	80	-	-	156
B2-Cinema-Stairwell	-	80	-	54
B2-Cinema-Tank Room	80	-	-	159
B2-Cinema-Corridor	-	80	-	44

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
		60	60	22	
B2-Cinema-Corridor		-	80	-	110
B2-Cinema-Corridor		-	80	-	66
B2-Cinema-Screen room		-	80	-	608
B2-Cinema-Corridor		-	80	-	85
B2-Cinema-Escape corridor		-	80	-	65
B2-Cinema-Stairwell		-	80	-	58
B2-Cinema-Screenroom		-	80	-	485
B2-Cinema-Lift Lobby		-	80	-	46
B1-Cinema-Screen Room		-	80	-	589
B1-Cinema-Stairwell		-	80	-	52
B1-Cinema-Lift Lobby		-	80	-	38
B1-Cinema-Stairwell		-	80	-	57
B1-Cinema-Stairwell		-	80	-	47
B1-Cinema-Corridor		-	80	-	26
B1-Cinema-Projector Room		80	-	-	249
B1-Cinema-LV Switch Room		80	-	-	115
B1-Cinema-Screen Room		-	80	-	394
B1-Cinema-Corridor		-	80	-	34
B1-Cinema-Store		80	-	-	14
B1-Cinema-LV Secondary Switch Room		80	-	-	43
B1-Cinema-Male WC		-	80	-	150
B1-Cinema-Female WC		-	80	-	166
B1-Cinema-Projection Room		80	-	-	154
B1-Cinema-Comms Room		80	-	-	40
B1-Cinema-Screen Room		-	80	-	848
B1-Cinema-Projection Room		80	-	-	200
B1-Cinema-Corridor		-	80	-	27
B1-Cinema-Store		80	-	-	17
B1-Cinema-Foyer		-	80	60	525
00-Cinema-Stairwell		-	80	-	67
00-Cinema-Stairwell		-	80	-	77
00-Cinema-Corridor		-	80	-	141
00-Cinema-Screen Room		-	80	-	785
00-Cinema-Office		80	-	-	381
00-Cinema-Corridor		-	80	-	28
00-Cinema-Projection Room		80	-	-	315
00-Cinema-Foyer		-	80	60	558
00-Cinema-Dis WC		-	80	-	60
00-Cinema-Kitchen		-	80	-	247
00-Cinema-Cafe		-	80	-	247

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?
B2-Cinema-Corridor	N/A	N/A
B2-Cinema-Corridor	N/A	N/A
B2-Cinema-Corridor	N/A	N/A
B2-Cinema-Screen room	N/A	N/A
B2-Cinema-Corridor	N/A	N/A
B2-Cinema-Escape corridor	N/A	N/A
B2-Cinema-Screenroom	N/A	N/A
B2-Cinema-Lift Lobby	N/A	N/A
B1-Cinema-Screen Room	N/A	N/A
B1-Cinema-Lift Lobby	N/A	N/A
B1-Cinema-Corridor	N/A	N/A
B1-Cinema-Projector Room	N/A	N/A
B1-Cinema-Screen Room	N/A	N/A
B1-Cinema-Corridor	N/A	N/A
B1-Cinema-Projection Room	N/A	N/A
B1-Cinema-Screen Room	N/A	N/A
B1-Cinema-Projection Room	N/A	N/A
B1-Cinema-Corridor	N/A	N/A
B1-Cinema-Foyer	N/A	N/A
00-Cinema-Corridor	N/A	N/A
00-Cinema-Screen Room	N/A	N/A
00-Cinema-Office	YES (+0.7%)	NO
00-Cinema-Corridor	N/A	N/A
00-Cinema-Projection Room	N/A	N/A
00-Cinema-Foyer	YES (+17.2%)	NO
00-Cinema-Kitchen	NO (-16.7%)	NO
00-Cinema-Cafe	YES (+10%)	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?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	1740.5	1740.5
External area [m ²]	2080.3	2080.3
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	5	3
Average conductance [W/K]	556.8	642.57
Average U-value [W/m ² K]	0.27	0.31
Alpha value* [%]	9.92	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
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

100 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	1.9	1.46
Cooling	5.74	5.92
Auxiliary	19.46	12.73
Lighting	13.83	20.81
Hot water	2.72	3.24
Equipment*	54.88	54.88
TOTAL**	43.65	44.16

* 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]	101.16	94.2
Primary energy* [kWh/m ²]	130.65	132.19
Total emissions [kg/m ²]	22.1	22.3

* 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] Fan coil systems, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
Actual	19.8	109.8	1.9	7.8	25.6	2.89	3.92	3.22	5	
Notional	13.2	109.3	1.4	8	16.7	2.56	3.79	----	----	
[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
Actual	39.9	0	3.7	0	4.3	3.02	0	3.22	0	
Notional	27.2	0	3	0	2.8	2.56	0	----	----	
[ST] No Heating or Cooling										
Actual	0	0	0	0	0	0	0	0	0	
Notional	0	0	0	0	0	0	0	----	----	

Key to terms

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

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	0.18	B2000000:Surf[1]
Floor	0.2	0.2	B2000000:Surf[0]
Roof	0.15	0.15	B1000001:Surf[0]
Windows, roof windows, and rooflights	1.5	1.4	00000000:Surf[0]
Personnel doors	1.5	1.1	00000000:Surf[2]
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building
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	5