BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Castlewood House Be Green Rev A

As designed

Date: Wed Jan 11 18:05:21 2017

Administrative information

Building Details

Address: ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.4.0"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.4.0

BRUKL compliance check version: v5.2.g.3

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name:

Telephone number:

Address: , ,

Criterion 1: The calculated CO_2 emission rate for the building should not exceed the target

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	25.9
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	25.9
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	20.3
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 the building services should achieve reasonable overall standards of energy efficiency

Values not achieving standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.26	0.26	External Wall
Floor	0.25	0.22	0.22	Exposed Floor
Roof	0.25	0.18	0.18	Roof
Windows***, roof windows, and rooflights	2.2	1.41	1.47	03 Win 02
Personnel doors	2.2	-	-	No personal doors in project
Vehicle access & similar large doors	1.5	-	-	No vehicle doors in project
High usage entrance doors	3.5	-	-	No high usage entrance doors in project

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]
$U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

* 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- Office (172 Zones)

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.97	5.6	-	1.4	0.75
Standard value	0.91*	2.6	N/A	1.6^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for gas single boiler systems <=2 MW output. 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.

^ Allowed SFP may be increased by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

2- Retail (20 Zones)

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.97	5.6	-	1.4	0.75
Standard value	0.91*	2.6	N/A	1.6^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for gas single boiler systems <=2 MW output. 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.

^ Allowed SFP may be increased by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

3- WC (48 Zones)

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.97	-	-	1.4	0.75
Standard value	0.91*	N/A	N/A	1.5^	0.65
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

* Standard shown is for gas single boiler systems <=2 MW output. 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.

^ Allowed SFP may be increased by the amounts specified in the Non-Domestic Building Services Compliance Guide if the system includes additional components as listed in the Guide.

4- Circ

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	0.97	-	-	-	-
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					YES

* 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.

5- Kitchen (3 Zones)

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

1- New DHW Circuit

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	0.97	0
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.

2- Retail and Kitchen

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.97	0
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.		

"No zones in project where local mechanical ventilation, exhaust, or terminal unit is applicable"

General lighting and display lighting	**Luminous efficacy [lm/W]**			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
B2-PWS Tank Room-01	70	-	-	933
B2-Switch Room-01	70	-	-	548
B2-Sprinkler Pump-01	70	-	-	1063
B2-Stair-01	-	70	-	109
B2-Stair-02	-	70	-	76
B2-Circ-01	-	70	-	34
09-Stair-01	-	70	-	57
B1-Cycle Circ-01	-	70	-	73
B1-Circ-01	-	70	-	64
B1-Female Circ-01	-	70	-	205
B1-Male Circ-01	-	70	-	150
B1-Stair-01	-	70	-	52
B1-Stair-02	-	70	-	55
09-Stair 1 Circ-01	-	70	-	68
10-Circ-01	-	70	-	37
B1 -Pump Room-01	70	-	-	862
B2-Security-01	100	-	-	90
B2-Engineering-01	100	-	-	134
B1-WC-01	-	70	-	38
B1-WC-02	-	70	-	38
10-WC-02	-	70	-	51
B1-Dis WC-01	-	70	-	64
B1-Female Showers-01	-	70	-	69
B1-Male Showers-01	-	70	-	68
00-Circ-01	-	70	-	113
00-Circ-02	-	70	-	135
00- Stair 1 Circ-01	-	70	-	78
00-Stair-01	-	70	-	69
00- Stair-02	-	70	-	70
00-Reception-01	-	70	22	549
01-Stair-01	-	70	-	57
01-Stair-02	-	70	-	54
01-Stair 1 Circ-01	-	70	-	68
01-Stair 2 Circ-01	-	70	-	54
01-Circ-01	-	70	-	119
01-WC-01	-	70	-	113

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
01-WC-02	-	70	-	135
02-Stair-01	-	70	-	57
02-Stair-02	-	70	-	54
02-Stair 1 Circ-01	-	70	-	68
02-Stair 2 Circ-01	-	70	-	54
02-Circ-01	-	70	-	119
01-WC-03	-	70	-	48
02-WC-01	-	70	-	129
02-WC-02	-	70	-	141
02-WC-03	-	70	-	48
03-Stair-01	-	70	-	56
03-Stair-02	-	70	-	54
03-Stair 1 Circ-01	-	70	-	69
03-Stair 2 Circ-01	-	70	-	54
03-Circ-01	-	70	-	119
03-WC-01	-	70	-	132
03-WC-02	-	70	-	141
03-WC-03	-	70	-	48
04-Stair-01	-	70	-	57
04-Stair-02	-	70	-	54
04-Stair 1 Circ-01	-	70	-	69
04-Stair 2 Circ-01	-	70	-	54
04-Circ-01	-	70	-	113
04-WC-01	-	70	-	132
04-WC-02	-	70	-	141
04-WC-03	-	70	-	49
05-Stair-01	-	70	-	57
05-Stair-02	-	70	-	54
05-Stair 1 Circ-01	-	70	-	68
05-Stair 2 Circ-01	-	70	-	54
05-Circ-01	-	70	-	119
05-WC-01	-	70	-	115
05-WC-02	-	70	-	137
05-WC-03	-	70	-	48
06-Stair-01	-	70	-	57
06-Stair-02	-	70	-	54
06-Stair 1 Circ-01	-	70	-	68
06-Stair 2 Circ-01	-	70	-	54
06-Circ-01	-	70	-	119
06-WC-01	-	70	-	112
06-WC-02	-	70	-	135
06-WC-03	-	70	-	48
07-Stair-01	-	70	-	57

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
07-Stair-02	-	70	-	54
07-Stair 1 Circ-01	-	70	-	68
07-Stair 2 Circ-01	-	70	-	54
07-Circ-01	-	70	-	119
07-WC-01	-	70	-	112
07-WC-02	-	70	-	136
07-WC-03	-	70	-	48
08-Stair-01	-	70	-	57
08-Stair-02	-	70	-	54
08-Stair 1 Circ-01	-	70	-	69
08-Stair 2 Circ-01	-	70	-	54
08-Circ-01	-	70	-	119
08-WC-01	-	70	-	99
08-WC-02	-	70	-	108
08-WC-03	-	70	-	48
09-Circ-01	-	70	-	119
09-Stair 2 Circ-01	-	70	-	54
09-Stair-02	-	70	-	54
09-WC-01	-	70	-	99
09-WC-02	-	70	-	106
09-WC-03	-	70	-	48
10-Circ-02	-	70	-	36
01-Office-01	100	-	-	1133
01-Office-02	100	-	-	132
01-Office-03	100	-	-	366
01-Office-04	100	-	-	482
01-Office-05	100	-	-	1531
01-Office-06	100	-	-	184
01-Office-07	100	-	-	231
01-Office-08	100	-	-	163
01-Office-09	100	-	-	480
01-Office-10	100	-	-	93
01-Office-11	100	-	-	181
01-Office-12	100	-	-	92
02-Office-01	100	-	-	1575
02-Office-02	100	-	-	132
02-Office-03	100	-	-	366
02-Office-04	100	-	-	481
02-Office-05	100	-	-	1545
02-Office-06	100	-	-	209
02-Office-07	100	-	-	246
02-Office-08	100	-	-	179
02-Office-09	100	-	-	583

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
02-Office-10	100	-	-	82
02-Office-11	100	-	-	136
02-Office-12	100	-	-	153
02-Office-13	100	-	-	142
03-Office-01	100	-	-	1575
03-Office-02	100	-	-	132
03-Office-03	100	-	-	366
03-Office-04	100	-	-	244
03-Office-05	100	-	-	134
03-Office-06	100	-	-	176
03-Office-07	100	-	-	1091
10-Stair-02	-	70	-	54
B1-Circ-02	-	70	-	86
10-WC-01	-	70	-	52
B2-Circ-02	-	70	-	73
01-Circ-02	-	70	-	112
03-Circ-02	-	70	-	39
05-Circ-02	-	70	-	38
04-Circ-02	-	70	-	39
06-Circ-02	-	70	-	38
07-Circ-02	-	70	-	38
09-Circ-02	-	70	-	38
08-Circ-02	-	70	-	38
B1-UKPN-01	70	-	-	257
B1-Gas Meter Room-01	70	-	-	43
01-Office-13	100	-	-	749
B1-Comms Room-01	65	-	-	19
B1 Stair 1 Circ-01	-	70	-	27
B2-Circ-03	-	70	-	47
01-Office-14	100	-	-	675
02-Office-14	100	-	-	870
02-Office-15	100	-	-	877
02-Office-16	100	-	-	457
02-Office-17	100	-	-	218
02-Office-18	100	-	-	302
02-Office-19	100	-	-	671
02-Office-20	100	-	-	837
02-Office-21	100	-	-	590
01-Office-16	100	-	-	219
01-Office-17	100	-	-	303
01-Office-18	100	-	-	676
01-Office-19	100	-	-	250
03-Office-08	100	-	-	169

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
03-Office-09	100	-	-	287
03-Office-10	100	-	-	178
03-Office-11	100	-	-	583
03-Office-12	100	-	-	82
03-Office-13	100	-	-	136
03-Office-14	100	-	-	153
03-Office-15	100	-	-	142
03-Office-16	100	-	-	870
03-Office-17	100	-	-	877
03-Office-18	100	-	-	456
03-Office-19	100	-	-	216
03-Office-20	100	-	-	460
03-Office-21	100	-	-	772
03-Office-22	100	-	-	265
03-Office-23	100	-	-	589
04-Office-01	100	-	-	1573
04-Office-02	100	-	-	131
04-Office-03	100	-	-	362
04-Office-04	100	-	-	154
04-Office-05	100	-	-	106
04-Office-06	100	-	-	184
04-Office-07	100	-	-	1099
04-Office-08	100	-	-	169
04-Office-09	100	-	-	287
04-Office-10	100	-	-	178
04-Office-11	100	-	-	583
04-Office-12	100	-	-	82
04-Office-13	100	-	-	136
04-Office-14	100	-	-	153
04-Office-15	100	-	-	142
04-Office-16	100	-	-	870
04-Office-17	100	-	-	877
04-Office-18	100	-	-	456
04-Office-19	100	-	-	271
04-Office-20	100	-	-	383
04-Office-21	100	-	-	772
04-Office-22	100	-	-	265
04-Office-23	100	-	-	589
05-Office-01	100	-	-	1573
05-Office-02	100	-	-	131
05-Office-03	100	-	-	411
05-Office-04	100	-	-	132
05-Office-05	100	-	-	119

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
05-Office-06	100	-	-	803
05-Office-07	100	-	-	207
05-Office-08	100	-	-	248
05-Office-09	100	-	-	178
05-Office-10	100	-	-	583
05-Office-11	100	-	-	82
05-Office-12	100	-	-	136
05-Office-13	100	-	-	153
05-Office-14	100	-	-	142
05-Office-15	100	-	-	870
05-Office-16	100	-	-	901
05-Office-17	100	-	-	457
05-Office-18	100	-	-	229
05-Office-19	100	-	-	260
05-Office-20	100	-	-	697
05-Office-21	100	-	-	254
05-Office-22	100	-	-	590
06-Office-01	100	-	-	1155
06-Office-02	100	-	-	105
06-Office-03	100	-	-	111
06-Office-04	100	-	-	441
06-Office-05	100	-	-	130
06-Office-06	100	-	-	120
06-Office-07	100	-	-	669
06-Office-08	100	-	-	189
06-Office-09	100	-	-	267
06-Office-10	100	-	-	790
06-Office-11	100	-	-	74
06-Office-12	100	-	-	136
06-Office-13	100	-	-	152
06-Office-14	100	-	-	155
06-Office-15	100	-	-	870
06-Office-16	100	-	-	901
06-Office-17	100	-	-	472
06-Office-18	100	-	-	382
06-Office-19	100	-	-	784
06-Office-20	100	-	-	265
06-Office-21	100	-	-	569
07-Office-01	100	-	-	1155
07-Office-02	100	-	-	105
07-Office-03	100	-	-	111
07-Office-04	100	-	-	411
07-Office-05	100	-	-	130

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
07-Office-06	100	-	-	120
07-Office-07	100	-	-	672
07-Office-08	100	-	-	190
07-Office-09	100	-	-	267
07-Office-10	100	-	-	177
07-Office-11	100	-	-	583
07-Office-12	100	-	-	82
07-Office-13	100	-	-	137
07-Office-14	100	-	-	152
07-Office-15	100	-	-	155
07-Office-16	100	-	-	870
07-Office-17	100	-	-	901
07-Office-18	100	-	-	375
07-Office-19	100	-	-	233
07-Office-20	100	-	-	296
07-Office-21	100	-	-	783
07-Office-22	100	-	-	265
07-Office-23	100	-	-	590
08-Office-01	100	-	-	957
08-Office-02	100	-	-	262
08-Office-03	100	-	-	172
08-Office-04	100	-	-	132
08-Office-05	100	-	-	1189
08-Office-06	100	-	-	287
08-Office-07	100	-	-	841
08-Office-08	100	-	-	126
08-Office-09	100	-	-	959
08-Office-10	100	-	-	423
09-Office-01	100	-	-	1155
09-Office-02	100	-	-	499
09-Office-03	100	-	-	1175
09-Office-04	100	-	-	287
09-Office-05	100	-	-	844
09-Office-06	100	-	-	978
09-Office-07	100	-	-	424
10-Office-01	100	-	-	516
00-Reception-02	-	70	22	316
01-Office-15	100	-	-	935
B2-First Aid-01	100	-	-	104
B2-Staff Room-01	100	-	-	182
00-FM Services-01	100	-	-	159
00-FC Centre-01	100	-	-	105
00-Dock Manager-01	100	-	-	102

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
B1-Retail Change-01	-	70	-	49
B1-Male Showers-02	-	70	-	13
B1-Female Showers-02	-	70	-	14
B1-Retail Shower-01	-	70	-	13
B1 Dis Change Circ-01	-	70	-	34
00-WC-01	-	70	-	55
B1-Stair 2 Circ-01	-	70	-	38
B1-Retail Circ-01	-	70	-	300
00- Stair 2 Circ-01	-	70	-	65
00-Recep WC Circ-01	-	70	-	39
00-WC-02	-	70	-	59
10-Stair 2 Circ-01	-	70	-	56
00-Retail-01	-	65	22	1049
00-Retail-02.1	-	65	22	1621
00-Retail-02.3	-	65	22	708
00-Retail-03.1	-	65	22	1034
00-Retail-04.1	-	65	22	485
00-Retail-04.2	-	65	22	292
00-Retail-04.3	-	65	22	725
00-Retail-02.2	-	65	22	884
00-Retail-03.2	-	65	22	1593
00-Retail-05.1	-	65	22	142
00-Retail-05.2	-	65	22	132
00-Retail-06.1	-	65	22	64
00-Retail-06.2	-	65	22	221
00-Retail-06.3	-	65	22	198
B1-Retail-02.1	-	60	22	774
B1-Retail-03.1	-	65	22	2392
B1-Retail-04.1	-	65	22	6121
B1-Retail-05.1	-	65	22	507
00-Kitchen 05	-	65	-	408
00-Kitchen 06	-	65	-	598
00-Kitchen-02	-	65	-	1061
00-Retail-04.4	-	65	22	328
00-Retail-04.5	-	65	22	478

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-Security-01	N/A	N/A
B2-Engineering-01	N/A	N/A
00-Reception-01	NO (-43%)	NO
01-Office-01	NO (-49%)	NO
01-Office-02	NO (-74%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
01-Office-03	NO (-39%)	NO
01-Office-04	NO (-69%)	NO
01-Office-05	NO (-58%)	NO
01-Office-06	NO (-52%)	NO
01-Office-07	NO (-43%)	NO
01-Office-08	NO (-50%)	NO
01-Office-09	NO (-46%)	NO
01-Office-10	NO (-46%)	NO
01-Office-11	NO (-27%)	NO
01-Office-12	NO (-45%)	NO
02-Office-01	NO (-51%)	NO
02-Office-02	NO (-72%)	NO
02-Office-03	NO (-32%)	NO
02-Office-04	NO (-71%)	NO
02-Office-05	NO (-57%)	NO
02-Office-06	NO (-42%)	NO
02-Office-07	NO (-23%)	NO
02-Office-08	NO (-41%)	NO
02-Office-09	NO (-10%)	NO
02-Office-10	NO (-37%)	NO
02-Office-11	NO (-40%)	NO
02-Office-12	NO (-40%)	NO
02-Office-13	NO (-48%)	NO
03-Office-01	NO (-54%)	NO
03-Office-02	NO (-76%)	NO
03-Office-03	NO (-40%)	NO
03-Office-04	NO (-52%)	NO
03-Office-05	NO (-60%)	NO
03-Office-06	NO (-57%)	NO
03-Office-07	NO (-50%)	NO
01-Office-13	NO (-61%)	NO
01-Office-14	NO (-76%)	NO
02-Office-14	NO (-68%)	NO
02-Office-15	NO (-81%)	NO
02-Office-16	NO (-15%)	NO
02-Office-17	NO (-32%)	NO
02-Office-18	NO (-73%)	NO
02-Office-19	NO (-83%)	NO
02-Office-20	NO (-65%)	NO
02-Office-21	NO (-69%)	NO
01-Office-16	NO (-23%)	NO
01-Office-17	NO (-67%)	NO
01-Office-18	NO (-76%)	NO
01-Office-19	NO (-68%)	NO
03-Office-08	NO (-47%)	NO
03-Office-09	NO (-29%)	NO
03-Office-10	NO (-42%)	NO
03-Office-11	NO (-21%)	NO
03-Office-12	NO (-43%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
03-Office-13	NO (-45%)	NO
03-Office-14	NO (-46%)	NO
03-Office-15	NO (-53%)	NO
03-Office-16	NO (-74%)	NO
03-Office-17	NO (-85%)	NO
03-Office-18	NO (-31%)	NO
03-Office-19	NO (-32%)	NO
03-Office-20	NO (-63%)	NO
03-Office-21	NO (-78%)	NO
03-Office-22	NO (-66%)	NO
03-Office-23	NO (-76%)	NO
04-Office-01	NO (-47%)	NO
04-Office-02	NO (-70%)	NO
04-Office-03	NO (-27%)	NO
04-Office-04	NO (-63%)	NO
04-Office-05	NO (-61%)	NO
04-Office-06	NO (-58%)	NO
04-Office-07	NO (-52%)	NO
04-Office-08	NO (-42%)	NO
04-Office-09	NO (-18%)	NO
04-Office-10	NO (-40%)	NO
04-Office-11	NO (-2%)	NO
04-Office-12	NO (-33%)	NO
04-Office-13	NO (-39%)	NO
04-Office-14	NO (-39%)	NO
04-Office-15	NO (-48%)	NO
04-Office-16	NO (-69%)	NO
04-Office-17	NO (-83%)	NO
04-Office-18	NO (-10%)	NO
04-Office-19	NO (-11%)	NO
04-Office-20	NO (-59%)	NO
04-Office-21	NO (-80%)	NO
04-Office-22	NO (-63%)	NO
04-Office-23	NO (-70%)	NO
05-Office-01	NO (-53%)	NO
05-Office-02	NO (-75%)	NO
05-Office-03	NO (-33%)	NO
05-Office-04	NO (-59%)	NO
05-Office-05	NO (-57%)	NO
05-Office-06	NO (-47%)	NO
05-Office-07	NO (-43%)	NO
05-Office-08	NO (-23%)	NO
05-Office-09	NO (-44%)	NO
05-Office-10	NO (-18%)	NO
05-Office-11	NO (-40%)	NO
05-Office-12	NO (-44%)	NO
05-Office-13	NO (-46%)	NO
05-Office-14	NO (-55%)	NO
05-Office-15	NO (-75%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
05-Office-16	NO (-87%)	NO
05-Office-17	NO (-30%)	NO
05-Office-18	NO (-19%)	NO
05-Office-19	NO (-56%)	NO
05-Office-20	NO (-75%)	NO
05-Office-21	NO (-66%)	NO
05-Office-22	NO (-76%)	NO
06-Office-01	NO (-33%)	NO
06-Office-02	NO (-40%)	NO
06-Office-03	NO (-42%)	NO
06-Office-04	NO (-4%)	NO
06-Office-05	NO (-51%)	NO
06-Office-06	NO (-50%)	NO
06-Office-07	NO (-40%)	NO
06-Office-08	NO (-35%)	NO
06-Office-09	NO (-14%)	NO
06-Office-10	NO (-14%)	NO
06-Office-11	NO (-27%)	NO
06-Office-12	NO (-35%)	NO
06-Office-13	NO (-42%)	NO
06-Office-14	NO (-42%)	NO
06-Office-15	NO (-60%)	NO
06-Office-16	NO (-71%)	NO
06-Office-17	NO (-35%)	NO
06-Office-18	NO (-50%)	NO
06-Office-19	NO (-71%)	NO
06-Office-20	NO (-61%)	NO
06-Office-21	NO (-66%)	NO
07-Office-01	NO (-28%)	NO
07-Office-02	NO (-43%)	NO
07-Office-03	NO (-47%)	NO
07-Office-04	NO (-25%)	NO
07-Office-05	NO (-54%)	NO
07-Office-06	NO (-54%)	NO
07-Office-07	NO (-44%)	NO
07-Office-08	NO (-41%)	NO
07-Office-09	NO (-26%)	NO
07-Office-10	NO (-55%)	NO
07-Office-11	NO (-12%)	NO
07-Office-12	NO (-28%)	NO
07-Office-13	NO (-33%)	NO
07-Office-14	NO (-40%)	NO
07-Office-15	NO (-37%)	NO
07-Office-16	NO (-60%)	NO
07-Office-17	NO (-69%)	NO
07-Office-18	NO (-44%)	NO
07-Office-19	NO (-9%)	NO
07-Office-20	NO (-56%)	NO
07-Office-21	NO (-75%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
07-Office-22	NO (-69%)	NO
07-Office-23	NO (-73%)	NO
08-Office-01	NO (-31%)	NO
08-Office-02	NO (-28%)	NO
08-Office-03	NO (-20%)	NO
08-Office-04	NO (-34%)	NO
08-Office-05	NO (-21%)	NO
08-Office-06	NO (-30%)	NO
08-Office-07	NO (-17%)	NO
08-Office-08	NO (-25%)	NO
08-Office-09	NO (-30%)	NO
08-Office-10	NO (-34%)	NO
09-Office-01	NO (-29%)	NO
09-Office-02	NO (-29%)	NO
09-Office-03	NO (-17%)	NO
09-Office-04	NO (-31%)	NO
09-Office-05	NO (-16%)	NO
09-Office-06	NO (-36%)	NO
09-Office-07	NO (-42%)	NO
10-Office-01	NO (-42%)	NO
00-Reception-02	NO (-44%)	NO
01-Office-15	NO (-43%)	NO
B2-First Aid-01	N/A	N/A
B2-Staff Room-01	N/A	N/A
00-FM Services-01	N/A	N/A
00-FC Centre-01	N/A	N/A
00-Dock Manager-01	N/A	N/A
00-Retail-01	NO (-57%)	NO
00-Retail-02.1	NO (-45%)	NO
00-Retail-02.3	NO (-58%)	NO
00-Retail-03.1	NO (-50%)	NO
00-Retail-04.1	NO (-14%)	NO
00-Retail-04.2	NO (-51%)	NO
00-Retail-04.3	NO (-31%)	NO
00-Retail-02.2	NO (-48%)	NO
00-Retail-03.2	NO (-85%)	NO
00-Retail-05.1	NO (-32%)	NO
00-Retail-05.2	NO (-47%)	NO
00-Retail-06.1	NO (-40%)	NO
00-Retail-06.2	NO (-24%)	NO
00-Retail-06.3	NO (-41%)	NO
B1-Retail-02.1	N/A	N/A
B1-Retail-03.1	N/A	N/A
B1-Retail-04.1	N/A	N/A
B1-Retail-05.1	N/A	N/A
00-Retail-04.4	NO (-13%)	NO
00-Retail-04.5	NO (-12%)	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?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m^2]	18330	18330
External area [m^2]	86739	86739
Weather	LON	LON
Infiltration [m^3/hm^2@ 50Pa]	5	3
Average conductance [W/K]	26204	24468
Average U-value [W/m^2K]	0.3	0.28
Alpha value* [%]	2.84	2.84

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

Building Use

% Area	Building Type
6	**A1/A2 Retail/Financial and Professional services**
5	**A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways**
90	**B1 Offices and Workshop businesses**
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Inst.: Hospitals and Care Homes
	C2 Residential Inst.: Residential schools
	C2 Residential Inst.: Universities and colleges
	C2A Secure Residential Inst.
	Residential spaces
	D1 Non-residential Inst.: Community/Day Centre
	D1 Non-residential Inst.: Libraries, Museums, and Galleries
	D1 Non-residential Inst.: Education
	D1 Non-residential Inst.: Primary Health Care Building
	D1 Non-residential Inst.: 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/m^2]

	Actual	Notional
Heating	3.56	2.65
Cooling	5.45	10.43
Auxiliary	11.33	10.73
Lighting	17.88	24.17
Hot water	10.38	11.06
Equipment*	47.68	47.68
TOTAL**	**48.59**	**59.04**

* Energy used by equipment does not count towards the total for calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	0.55	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	122.29	150.52
Primary energy* [kWh/m^2]	120.72	152.4
Total emissions [kg/m^2]	20.3	25.9

* 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] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	11.4	120.2	3.4	6.3	12.7	0.92	5.32	0.97	5.6
	Notional	8	154.3	2.7	11.9	12.2	0.82	3.6	----	----
[ST] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	19.9	245.9	6	12.8	21.9	0.92	5.32	0.97	5.6
	Notional	6.4	328.8	2.2	25.4	20.6	0.82	3.6	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	2.7	0	0.8	0	7.4	0.92	0	0.97	0
	Notional	1.6	0	0.6	0	6.5	0.82	0	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	24.2	0	7.3	0	1.1	0.92	0	0.97	0
	Notional	19.1	0	6.5	0	1.1	0.82	0	----	----
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	0	0	0	0	45.2	0	0	0	0
	Notional	0	0	0	0	26.8	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 BCO can give particular attention to items with specifications that are better than typically expected.

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.26	External Wall
Floor	0.2	0.22	Ground Floor
Roof	0.15	0.18	Roof
Windows, roof windows, and rooflights	1.5	1.35	FH Win Ground
Personnel doors	1.5	-	No personal doors in project
Vehicle access & similar large doors	1.5	-	No vehicle doors in project
High usage entrance doors	1.5	-	No high usage entrance doors in project

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = 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	5