BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Carbon Court, Barnsley

As designed

Date: Fri Jan 16 16:39:57 2015

Administrative information

Building Details

Address: Carbon Court, Springvale Road, Park Springs, Barnsley, S72 7BF

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.2.b.1

Interface to calculation engine: G-ISBEM

Interface to calculation engine version: v18.0

BRUKL compliance check version: v5.2.b.1

Owner Details

Name: RSP Properties Ltd

Telephone number: 01226 827505

Address: 8 The Rise, Brierley, Barnsley, S72 9LN

Certifier details

Name: Roy Barnett

Telephone number: 01484 686039

Address: 86 Far Lane, Hepworth, Holmfirth, HD9 1TL

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

1.1	CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	19.4
1.2	Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	19.4
1.3	Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	-2.8
1.4	Are emissions from the building less than or equal to the target?	BER =< TER
1.5	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 which do not meet standards in the 2013 Non-Domestic Building Services Compliance Guide are displayed in red.

2.a Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.23	0.32	z0/OpenOff1/e.1
Floor	0.25	0.13	0.19	z0/Toilet1_B/f
Roof	0.25	0.16	0.16	z0/Toilet1_A/c
Windows***, roof windows, and rooflights	2.2	1.64	1.8	z1/Tea1/e/g
Personnel doors	2.2	1.43	1.5	z0/WkshpSS1_B/w/d
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

$U_{a\text{-}Limit}$ = 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	10

2.b 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- Air con

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	2.5	2.5	-	-	-
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					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- Handwash

	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**
z1/CellOff1_C	-	-	-	-	-	-	-	-	-	-	N/A
z1/Tea1	-	-	-	-	-	-	-	-	-	-	N/A
z0/OpenOff1	-	-	-	-	-	-	-	-	-	-	N/A
z0/Toilet1_B	1.5	-	-	-	-	-	-	-	-	-	N/A
z0/Toilet1_C	1.5	-	-	-	-	-	-	-	-	-	N/A
z0/Toilet1_A	1.5	-	-	-	-	-	-	-	-	-	N/A
z0/Reception1	-	-	-	-	-	-	-	-	-	-	N/A
z0/WkshpSS1_A	-	-	-	-	-	-	-	-	-	-	N/A
z0/Circ1	-	-	-	-	-	-	-	-	-	-	N/A
z0/WkshpSS1_B	-	-	-	-	-	-	-	-	-	-	N/A
z0/WkshpSS1_C	-	-	-	-	-	-	-	-	-	-	N/A
z1/CellOff1_A	-	-	-	-	-	-	-	-	-	-	N/A
z1/CellOff1_B	-	-	-	-	-	-	-	-	-	-	N/A
z1/Circ1	-	-	-	-	-	-	-	-	-	-	N/A
z1/Toilet1	1.5	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
z1/CellOff1_C	100	-	-	131
z1/Tea1	100	-	-	188
z0/OpenOff1	100	-	-	147
z0/Toilet1_B	-	168	-	8
z0/Toilet1_C	-	174	-	8
z0/Toilet1_A	-	184	-	8
z0/Reception1	-	200	50	133
z0/WkshpSS1_A	100	-	-	815
z0/Circ1	-	198	-	8
z0/WkshpSS1_B	100	-	-	1501
z0/WkshpSS1_C	100	-	-	347
z1/CellOff1_A	100	-	-	148
z1/CellOff1_B	100	-	-	134
z1/Circ1	-	206	-	20
z1/Toilet1	-	219	-	8

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?
z1/CellOff1_C	NO (-52.6%)	NO
z1/Tea1	YES (+40.4%)	YES
z0/OpenOff1	N/A	N/A
z0/Reception1	NO (-62%)	NO
z0/WkshpSS1_A	NO (-47.9%)	NO
z0/WkshpSS1_B	NO (-45.5%)	NO
z0/WkshpSS1_C	N/A	N/A
z1/CellOff1_A	NO (-4%)	YES
z1/CellOff1_B	YES (+38.1%)	YES

Criterion 4: The performance of the building, as built, should be consistent with the 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]	932.9	932.9
External area [m^2]	2415.6	2415.6
Weather	LEE	LEE
Infiltration [m^3/hm^2@ 50Pa]	10	6
Average conductance [W/K]	712.77	1027.59
Average U-value [W/m^2K]	0.3	0.43
Alpha value* [%]	95.48	31.57

* 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 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	19.57	13.43
Cooling	6.92	4.48
Auxiliary	0.66	0.18
Lighting	12.11	19.05
Hot water	1.74	2.01
Equipment*	21.91	21.91
TOTAL**	**41**	**39.16**

* 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	46.43	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]	199.47	175.61
Primary energy* [kWh/m^2]	125.87	113.4
Total emissions [kg/m^2]	-2.8	19.4

* 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	164.1	35.4	19.6	6.9	0.7	2.33	1.42	2.5	2
	Notional	117.5	58.1	13.4	4.5	0.2	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 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	0.2	z1/CellOff1_C/e
Floor	0.2	0.12	z0/WkshpSS1_C/f
Roof	0.15	0.16	z0/Toilet1_A/c
Windows, roof windows, and rooflights	1.5	1.6	z1/CellOff1_C/c/g1
Personnel doors	1.5	0.81	z0/WkshpSS1_A/e/d
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"

$U_{i\text{-}Typ}$ = 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	10