

BRUKL Output Document



Compliance with England Building Regulations Part L 2013

Project name

Premier Inn

As designed

Date: Thu Dec 11 09:21:24 2014

Administrative information

Building Details

Address: Langstone Road, HAVANT, PO9 1SA

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.2.d.2

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.2

BRUKL compliance check version: v5.2.d.2

Owner Details

Name: Whitbread Plc

Telephone number: 01582 424200

Address: Whitbread Court, Houghton Hall Business Park,
Porz Avenue, DUNSTABLE, LU5 5XE

Certifier details

Name: Andrew John Kay

Telephone number: 01778 347608

Address: The Old Bakehouse, 30 East End, Langtoft,
PETERBOROUGH, PE6 9LP

Criterion 1: The calculated CO₂ emission rate for the building should not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	67.5
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	67.5
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	61
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 -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.15	0.15	HTLN0018_W1_-1
Floor	0.25	0.15	0.15	HT000082_F_-1
Roof	0.25	0.1	0.1	HT000054_C_-1
Windows***, roof windows, and rooflights	2.2	0.9	0.9	HTLB0024_W2-W0
Personnel doors	2.2	1.4	1.4	HT0000A3_W0-W0
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 -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	NO
Whole building electric power factor achieved by power factor correction	0.9 to 0.95

1- VRF

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	5.43	4.4	-	-	-
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.					

2- Stairwell

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

1- SYST0001-DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.98	0.015
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	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Hotel En-Suite		0.9	-	-	-	-	-	-	-	-	-	N/A
Hotel Bedroom		-	-	-	0.9	-	-	-	-	-	0.85	0.5
Hotel En-Suite		0.9	-	-	-	-	-	-	-	-	-	N/A
Hotel Bedroom		-	-	-	0.9	-	-	-	-	-	0.85	0.5
Hotel En-Suite		0.9	-	-	-	-	-	-	-	-	-	N/A
Hotel Bedroom		-	-	-	0.9	-	-	-	-	-	0.85	0.5
Hotel En-Suite		0.9	-	-	-	-	-	-	-	-	-	N/A
Hotel Bedroom		-	-	-	0.9	-	-	-	-	-	0.85	0.5

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	
SF Corridor 3	-	-	-	-	-	-	-	-	-	-	N/A	
TF Linen Room	-	-	-	-	-	-	-	-	-	-	N/A	
TF Stairwell	-	-	-	-	-	-	-	-	-	-	N/A	
TF Fire Escape	-	-	-	-	-	-	-	-	-	-	N/A	
TF Corridor 1	-	-	-	-	-	-	-	-	-	-	N/A	
TF Corridor 2	-	-	-	-	-	-	-	-	-	-	N/A	
TF Corridor 3	-	-	-	-	-	-	-	-	-	-	N/A	
GF Stairwell	-	-	-	-	-	-	-	-	-	-	N/A	
GF Fire Escape	-	-	-	-	-	-	-	-	-	-	N/A	
GF Corridor 2	-	-	-	-	-	-	-	-	-	-	N/A	
GF Fire Escape	-	-	-	-	-	-	-	-	-	-	N/A	
Plantroom Area	-	-	-	-	-	-	-	-	-	-	N/A	
GF Linen Room	1	-	-	-	-	-	-	-	-	-	N/A	
Team Room	-	-	-	-	-	-	-	-	-	-	N/A	
Disabled Toilet	1	-	-	-	-	-	-	-	-	-	N/A	
BOH Lobby	-	-	-	-	-	-	-	-	-	-	N/A	
Cleaners Store	-	-	-	-	-	-	-	-	-	-	N/A	
Store Area	-	-	-	-	-	-	-	-	-	-	N/A	
Toilet Area	1	-	-	-	-	-	-	-	-	-	N/A	
GF Corridor 1	-	-	-	-	-	-	-	-	-	-	N/A	

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
Hotel En-Suite		-	44	-	40
Hotel Bedroom		-	235	-	30
Hotel En-Suite		-	44	-	40
Hotel Bedroom		-	238	-	42
Hotel En-Suite		-	44	-	40
Hotel Bedroom		-	238	-	42
Hotel En-Suite		-	44	-	40
Hotel Bedroom		-	235	-	30
Hotel En-Suite		-	44	-	40
Hotel Bedroom		-	238	-	42
Hotel En-Suite		-	44	-	40
Hotel Bedroom		-	238	-	42
Hotel En-Suite		-	44	-	40
Hotel Bedroom		-	205	-	42
Hotel En-Suite		-	44	-	40
Hotel Bedroom		-	205	-	42
Hotel En-Suite		-	44	-	40
Hotel Bedroom		-	235	-	30
Hotel En-Suite		-	44	-	40

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	238	-	42
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	238	-	42
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	238	-	42
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	238	-	42
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	205	-	42
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	205	-	42

Luminous efficacy [lm/W]		
Luminaire	Lamp	Display lamp

Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	238	-	42
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	238	-	42
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	238	-	42
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	238	-	42
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	205	-	42
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	205	-	42

General lighting and display lighting		Luminous efficacy [lm/W]		
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Hotel Bedroom	-	205	-	42
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	205	-	42
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	205	-	42
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30
Hotel En-Suite	-	44	-	40
Hotel Bedroom	-	235	-	30

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
Hotel En-Suite		-	44	-	40
Hotel Bedroom		-	235	-	30
Hotel En-Suite		-	44	-	40
Hotel Bedroom		-	235	-	30
Hotel En-Suite		-	44	-	40
Hotel Bedroom		-	235	-	30
Hotel En-Suite		-	44	-	40
Hotel Bedroom		-	235	-	30
Hotel Bedroom		-	213	-	42
Hotel En-Suite		-	70	-	40
Hotel Bedroom		-	213	-	42
Hotel En-Suite		-	70	-	40
Hotel Bedroom		-	213	-	42
Hotel En-Suite		-	70	-	40
Hotel Bedroom		-	213	-	42
Hotel En-Suite		-	70	-	40
Hotel Bedroom		-	213	-	42
Hotel En-Suite		-	70	-	40
Food Preparation Area		-	98	-	245
Wash Up Area		-	46	-	70
Main Entrance Lobby		-	122	-	24
Entrance/Restaurant Area		-	264	15	350
Reception Office		41	-	-	140
FF Linen Room		-	75	-	147
FF Stairwell		-	123	-	74
FF Fire Escape		-	83	-	56
FF Corridor 1		-	244	-	54
FF Corridor 2		-	93	-	84
FF Corridor 3		-	88	-	78
SF Linen Room		-	75	-	147
SF Stairwell		-	123	-	74
SF Fire Escape		-	83	-	56
SF Corridor 1		-	244	-	54
SF Corridor 2		-	93	-	84
SF Corridor 3		-	88	-	78
TF Linen Room		-	75	-	147
TF Stairwell		-	123	-	74
TF Fire Escape		-	83	-	56
TF Corridor 1		-	244	-	54
TF Corridor 2		-	93	-	84
TF Corridor 3		-	88	-	78
GF Stairwell		-	123	-	74
GF Fire Escape		-	83	-	56
GF Corridor 2		-	88	-	78
GF Fire Escape		-	53	-	56

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
Plantroom Area		23	-	-	98
GF Linen Room		-	96	-	147
Team Room		30	-	-	131
Disabled Toilet		-	127	-	21
BOH Lobby		-	56	-	16
Cleaners Store		12	-	-	16
Store Area		14	-	-	16
Toilet Area		-	101	-	21
GF Corridor 1		-	107	-	60

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?
Hotel Bedroom	NO (-89.6%)	NO
Hotel Bedroom	NO (-83.8%)	NO
Hotel Bedroom	NO (-81.1%)	NO
Hotel Bedroom	NO (-78.5%)	NO
Hotel Bedroom	NO (-81.1%)	NO
Hotel Bedroom	NO (-81.1%)	NO
Hotel Bedroom	NO (-78.6%)	NO
Hotel Bedroom	NO (-78.6%)	NO
Hotel Bedroom	NO (-65%)	NO
Hotel Bedroom	NO (-65%)	NO
Hotel Bedroom	NO (-65%)	NO
Hotel Bedroom	NO (-65%)	NO
Hotel Bedroom	NO (-65%)	NO
Hotel Bedroom	NO (-65%)	NO
Hotel Bedroom	NO (-65%)	NO
Hotel Bedroom	NO (-65%)	NO
Hotel Bedroom	NO (-65%)	NO
Hotel Bedroom	NO (-65%)	NO
Hotel Bedroom	NO (-65%)	NO
Hotel Bedroom	NO (-83.9%)	NO
Hotel Bedroom	NO (-91.9%)	NO
Hotel Bedroom	NO (-77.4%)	NO
Hotel Bedroom	NO (-77.4%)	NO
Hotel Bedroom	NO (-89.6%)	NO
Hotel Bedroom	NO (-83.8%)	NO
Hotel Bedroom	NO (-81.1%)	NO
Hotel Bedroom	NO (-78.5%)	NO
Hotel Bedroom	NO (-81.1%)	NO
Hotel Bedroom	NO (-81.1%)	NO
Hotel Bedroom	NO (-78.6%)	NO
Hotel Bedroom	NO (-78.6%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Hotel Bedroom	NO (-81.1%)	NO
Hotel Bedroom	NO (-83.8%)	NO
Entrance/Restaurant Area	NO (-66.9%)	NO
Reception Office	NO (-78%)	NO
Team Room	N/A	N/A

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]	2697.5	2697.5
External area [m ²]	2928.5	2928.5
Weather	SOU	SOU
Infiltration [m ³ /hm ² @ 50Pa]	5	3
Average conductance [W/K]	521.33	1512.68
Average U-value [W/m ² K]	0.18	0.52
Alpha value* [%]	33.88	16.62

* 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
100 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/m²]

	Actual	Notional
Heating	9.17	20.98
Cooling	4.05	5.74
Auxiliary	13.57	7.69
Lighting	16.54	16.95
Hot water	179.33	199.85
Equipment*	23.52	23.52
TOTAL **	222.65	251.2

* 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/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]	177.29	248.49
Primary energy* [kWh/m ²]	350.46	380.79
Total emissions [kg/m ²]	61	67.5

* 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] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	69	90.9	3.8	5.1	16.5	5.06	4.98	5.43	7.02
Notional	132.9	93.1	15.2	7.2	9.5	2.43	3.6	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	88.1	158.3	30.6	0	0.9	0.8	0	1	0
Notional	129.7	208.2	44	0	0.4	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 BCO can give particular attention to items with specifications that are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.15	HTLN0018_W1_-1
Floor	0.2	0.15	HT000082_F_-1
Roof	0.15	0.1	HT000054_C_-1
Windows, roof windows, and rooflights	1.5	0.9	HTLB0024_W2-W0
Personnel doors	1.5	1.4	HT0000A3_W0-W0
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-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	5