

Applied ENERGY

HSBC Bank Pension Trust (UK) Ltd.

Bakers House

Energy Strategy Report

Contents

EXECUTIVE SUMMARY	4
1.0 INTRODUCTION	5
1.1 Background.....	5
1.2 Site Description.....	5
2.0 POLICY AND PLANNING CONTEXT.....	6
2.1 Hillingdon Local Plan: Part 1	6
2.2 National Planning Policy Framework (NPPF).....	6
2.3 London Plan	7
2.4 GLA Guidance on Preparing Energy Assessments (March 2016).....	7
3.0 BUILDING ENERGY MODELLING.....	9
3.1 Building Simulation	9
4.0 DEMAND REDUCTION – ‘BE LEAN’	10
4.1 Building Fabric Performance	10
4.2 Heating	10
4.3 Cooling.....	11
4.4 Domestic Hot Water.....	11
4.5 Services Distribution	11
4.6 Ventilation	11
4.7 Lighting	12
4.8 Energy Saving Key Card Switches	12
4.9 Water Consumption	12
4.10 Building Energy Management System	13
4.11 Summary	13
4.12 Calculations.....	13
5.0 DECENTRALISED ENERGY – ‘BE CLEAN’	15
5.1 Connection to Existing Heating or Cooling Networks	15
5.2 Site Wide CHP Gas-fired CCHP/CHP Accompanied by Renewables.....	15
5.3 Calculations Summary	16

6.0 RENEWABLE AND LZC TECHNOLOGIES – ‘BE GREEN’ 18

6.1 Heating and Cooling 19

6.2 Solar Photovoltaic..... 19

6.3 Calculations..... 20

7.0 SUMMARY, CONCLUSIONS & RECOMMENDATIONS 22

APPENDIX..... 24

Appendix A. ‘Be Lean’ BRUKL 24

Appendix B. ‘Be Clean’ BRUKL..... 25

Appendix C. ‘Be Green’ BRUKL..... 26

EXECUTIVE SUMMARY

This energy strategy report has been prepared on behalf of HSBC Bank Pension Trust (UK) Ltd. for the proposed redevelopment of site to provide a nine-storey hotel, with ground floor retail unit, basement car parking and associated works.

The report takes account of guidance given in the national, regional and local policies including The London Plan 2016 and the London Borough of Hillingdon's planning documents.

This assessment demonstrates that the proposed scheme will improve the sustainability and environmental performance of the built environment by increasing energy efficiency, reducing CO₂ emissions, generating energy services efficiently and implementing building integrated Low or Zero Carbon (LZC) technology when compared to a traditional equivalent scheme.

The report demonstrates that the proposed scheme meets the energy and sustainability policies of the London Borough of Hillingdon by achieving a predicted reduction in regulated CO₂ emissions in excess of 35% against the 2013 Baseline Building through the use of energy efficiency measures, air source heat pumps for space heating and cooling and CHP for the generation of domestic hot water (DHW).

Bakers House	CO ₂ Emissions (kg/m ² /annum)	% Improvement CO ₂ Emissions Over TER
Baseline Target Emissions Rate (TER)	66.2	-
Energy Efficiency Measures Renewables/LZC Technologies and CHP	40.6	38.7%

Table 1 CO₂ Emissions Savings

The calculations and results contained within this report are based on the information available at the time of planning.

It should be noted that the National Calculation Method (NCM) makes a number of simplifications and assumptions in calculating the asset energy and emission rating to enable comparison of the design of similar building types and is therefore not necessarily representative of the actual in use energy consumption and these figures are inappropriate to be used for any design or consumption prediction purpose.

1.0 INTRODUCTION

1.1 Background

Applied Energy have been commissioned by HSBC Bank Pension Trust (UK) Ltd. to prepare an energy strategy to accompany the planning submission for the proposed redevelopment of site to provide a nine-storey hotel, with ground floor retail unit, basement car parking and associated works. This strategy identifies how the proposed works address the energy related policies of the London Borough of Hillingdon.

Options have been reviewed for reducing CO₂ emissions through energy efficiency measures, heating, cooling, hot water and renewable energy technologies. The local environment and proposed site have been considered throughout.

1.2 Site Description

Redevelopment of site to provide a nine-storey hotel, with ground floor retail unit, basement car parking and associated works. The site is located at 25 Bakers Road, Uxbridge.

The site location is shown in Figure 1



Figure 1: Proposed Site

2.0 POLICY AND PLANNING CONTEXT

This energy statement is based on The London Plan 2016 with guidance taken from the London Borough of Hillingdon Core Strategy 2012 and supplementary planning documents and includes:

- An energy demand assessment for heating, cooling, electricity and baseline CO₂ emissions
- A review of the design of the building and the potential for energy efficiency design measures
- An assessment of the feasibility of low carbon heating and cooling technologies
- An assessment of LZC technologies including details on possible technology/plant sizes and resulting carbon savings
- A summary identifying the preferred energy strategy and the overall CO₂ emissions reductions achieved over the Building Regulations 2013 compliance baseline.

2.1 Hillingdon Local Plan: Part 1

Policy BE1: Built Environment

10. Maximise the opportunities for all new homes to contribute to tackling and adapting to climate change and reducing emissions of local air quality pollutants. The Council will require all new development to achieve reductions in carbon dioxide emission in line with the London Plan targets through energy efficient design and effective use of low and zero carbon technologies. Where the required reduction from on-site renewable energy is not feasible within major developments, contributions off-site will be sought. The Council will seek to merge a suite of sustainable design goals, such as the use of SUDS, water efficiency, lifetime homes, and energy efficiency into a requirement measured against the Code for Sustainable Homes and BREEAM. These will be set out within the Hillingdon Local Plan: Part 2- Development Management Policies Local Development Document (LDD). All developments should be designed to make the most efficient use of natural resources whilst safeguarding historic assets, their settings and local amenity and include sustainable design and construction techniques to increase the re-use and recycling of construction, demolition and excavation waste and reduce the amount disposed to landfill.

2.2 National Planning Policy Framework (NPPF)

The NPPF sets out planning policies for England and Wales and how these are expected to be applied.

In determining planning applications, local planning authorities should expect new developments to:

- Comply with adopted Local Plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable.

- Take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption

2.3 London Plan

The London Plan contains an energy hierarchy: **Be Lean, Be Clean, Be Green**. This energy hierarchy outlines the approach to sustainable building design:

- Reduce the energy consumption of a building through passive measures (Be Lean)
- Supplying energy efficiently via building plant (Be Clean)
- Make use of LZC energy technologies to supplement conventional fuels where feasible (Be Green)

Between 2013 – 2016 it was required under the London Plan 2016 to achieve a 40% improvement on Part L 2010 CO₂ emissions via any combination of passive measures, active energy efficiency measures and LZC technologies.

From 2016 – 2019 the improvement on Part L 2010 CO₂ emissions is stated to be in line with Building Regulations to ensure a smooth trajectory towards a zero carbon standard.

Non-domestic buildings:	
Year	Improvement on 2010 Building Regulations
2010 – 2013	25 per cent
2013 – 2016	40 per cent
2016 – 2019	As per building regulations requirements
2019 - 2031	Zero Carbon

2.4 GLA Guidance on Preparing Energy Assessments (March 2016)

The guidance note provides further detail on how to prepare an energy assessment to accompany strategic planning applications as set out in London Plan Policy 5.2.

Section 6 (Non-residential development carbon dioxide targets) details how the GLA will continue to require that non-domestic developments seek to achieve a 35% reduction against Part L 2013 as detailed below.

6 Non-residential development carbon dioxide targets

- 6.1 For the period 2016 to 2019, London Plan policy 5.2B sets the carbon dioxide emissions target for non-residential development to be in line with Part L of the Building Regulations. This target was intended to align with the then expected improvement to Part L of the Building Regulations. However, as stated above, the Government announced⁹ (in July 2015) that it does not intend to proceed with the proposed 2016 increase in on-site energy efficiency standards, but will keep energy efficiency standards under review.
- 6.2 The London Plan policy setting out the Building Regulations target for non-residential development remains in place and was not changed by the recent Minor Alterations to the London Plan. However, a needs assessment and feasibility and viability study⁹ for the originally proposed Alteration tested a 50 per cent carbon reduction target¹⁰ for non-domestic development and showed that for a number of non-residential development types a 50 per cent carbon reduction target (beyond Part L 2013) would be technically feasible. The study also found that for most locations a 50 per cent target would be financially viable.
- 6.3 Whilst the target set out in policy 5.2B sets the Building Regulations as the target, part A of the policy seeks to minimise carbon dioxide emissions. The Energy Planning Policies Monitoring Report shows that for 2014 Stage 2 developments referred to the Mayor that they would achieve a 40% improvement beyond Part L 2010. The small number (seven) of schemes assessed against Part L 2013 showed a 37 per cent reduction in carbon dioxide emissions beyond the Building Regulations.
- 6.4 Given the above evidence and that policy 5.2B's emission reduction targets for non-domestic uses were intended to ensure a smooth trajectory towards a zero carbon standard, and the upcoming requirement for 'Nearly Zero Energy Buildings' by 2020¹¹ the GLA will continue to require that non-domestic development seek to achieve a 35 per cent reduction against Part L 2013.

This report is based on meeting the GLA requirements and Policy BE1 of the Hillingdon Local Plan.

3.0 BUILDING ENERGY MODELLING

3.1 Building Simulation

The proposed building has been thermally modelled using EDSL TAS dynamic simulation modelling software, version 9.4.2. This model has been produced to determine the annual energy demands and quantify the reductions in energy use and CO₂ emissions as a result of energy efficiency improvements.

This software contains the construction database which defines all the construction U-values for each of the building elements. Outputs from the simulation program include hourly kW demands arising from heating and cooling, small power, lighting and fan power. The model was simulated using the CIBSE test reference year (TRY) weather data for London, as required by Part L2A of the Building Regulations 2013. The outputs from the software allow gas and electrical consumption and related CO₂ emissions to be calculated. The building's performance can therefore be measured for compliance against the targeted reduction in CO₂ emissions.

The floor area referenced within this report is the modelled floor area of the building and excludes areas such as lift shafts, risers and voids etc. hence why there may be a discrepancy with architectural floor areas listed elsewhere in other documents.

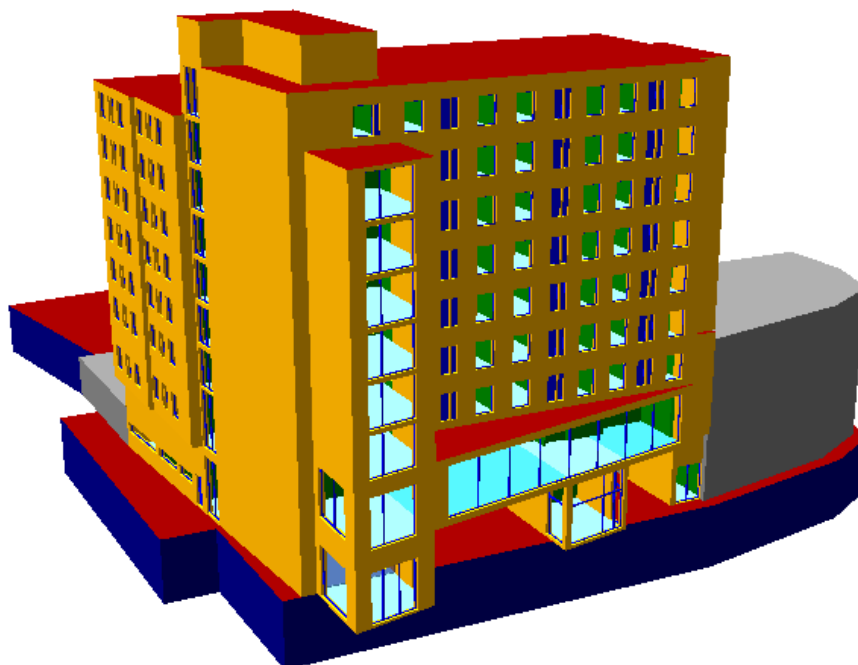


Figure 2: 3-D Model

4.0 DEMAND REDUCTION – ‘BE LEAN’

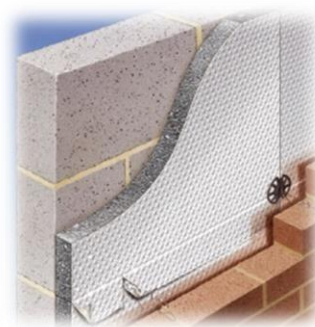
The primary design aim is to reduce energy requirements through energy efficiency measures and good practice sustainable building services. This must result in an improvement in the building’s energy performance over and above the minimum levels stipulated within Part L of the Building Regulations

4.1 Building Fabric Performance

The proposed hotel will be built with area weighted U-values exceeding those proposed in Building Regulations Part L2A (2013) for the opaque building fabric and glazing elements.

New buildings are required to be pressure tested under Building Regulations Part L2A (2013) with the maximum permissible air leakage set at $10\text{m}^3/(\text{h.m}^2)$ @ 50 Pa. It is proposed that all endeavours will be taken to improve the air leakage performance of the building to $5\text{m}^3/(\text{h.m}^2)$ @ 50Pa to further improve the energy efficiency of the building.

In order to minimise overheating, glazing will be enhanced to reduce heat gain to the main occupied areas of the building. It is therefore proposed that all glazing will be specified with a SHGC (solar heat gain coefficient) of no more than 0.4 to minimise heat gain. In addition, curtains are to be provided to each room to provide independent occupant control to further reduce the level of heat gain into the space



4.2 Heating

The proposed scheme will utilise air source heat pumps (ASHP) for the space heating and cooling. However, the heating from ASHP is considered renewable and therefore assessed later in the ‘Be Green’ section of this report.

Therefore, for this part of the assessment, the heating has been modelled as four pipe fan coil units and radiators with boilers. An efficiency of 91% has been used for the boilers to bring this in line with the Notional Building to quantify the improvements from energy efficiency measures as set out in the GLA Guidance to producing an energy strategy.



4.3 Cooling

Air Source Heat Pumps (ASHP) are proposed to provide space heating and cooling to all bedroom and public areas.

ASHPs extract thermal energy from the surrounding air and can be used to provide heating and/or cooling. As outlined in the previous section, the heating contribution from the ASHP will be assessed in the 'Be Green' section and therefore only the benefit from the enhanced cooling efficiency will be included within this 'Be Lean' assessment.



4.4 Domestic Hot Water

Domestic hot water is the largest energy consumer in an hotel and to minimise energy usage it is proposed that high efficiency gas fired water heaters with an efficiency of over 95% are utilised.

The proposed water heaters will be selected with low NOx emissions to reduce the impact on the local environment.



4.5 Services Distribution

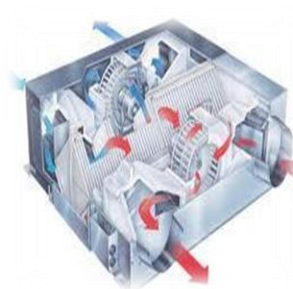
All services pipework, valves, fittings and ductwork will be insulated to minimise unwanted heat loss or heat gain.

4.6 Ventilation

It is proposed that mechanical supply and extract ventilation will be provided for guestrooms and front of house areas which will incorporate heat recovery between the supply and extract ventilation paths.

Ventilation rates and specific fans powers will be in accordance with Building Regulations Part L2A and CIBSE Guide B2.

Heat recovery efficiencies will be greater than 73% as required by relevant EU directives.



4.7 Lighting

It is proposed that LED and low energy compact fluorescent lighting will be used with automatic and/or manual switching facilities. The use of photocells (daylight sensors) to control the external lighting will be provided. PIR (Passive Infrared) detectors to control lighting in low occupancy back of house areas and bedroom corridors will also be installed to assist in reducing energy wastage. The lighting design throughout the hotel will incorporate high efficacy lamps to ensure compliance with Building Regulations whilst providing the required lighting levels and environment.



4.8 Energy Saving Key Card Switches

An energy saving key card switch will be installed within each guestroom to control the lighting circuit and ensure that energy is not being wasted when rooms are unoccupied



4.9 Water Consumption

In order to minimise the impact of the development on the local water infrastructure, water saving techniques will be incorporated to help reduce site consumption. Below is a list of proposed water saving measures:

The design team will ensure that the water consumption (litres/person/day) for the building when compared against a notional baseline performance level is reduced by a minimum of 25%. To achieve this, the following sanitary ware will be specified:

- WC total effect flush volume of 4.5l/min;
- Showers with a nominal flow rate of 8l/min (at 1.5 bar pressure)
- Baths 140l capacity
- Taps with a maximum of 5l/min with low flow regulators (e.g. timed turn off, electronic, spray or aerated).



4.10 Building Energy Management System

It is proposed that a Building Energy Management System (BEMS) is installed to monitor, control and sequence key mechanical and electrical plant to help drive out energy savings through effective control strategies.



4.11 Summary

A summary of the above proposed measures and energy efficiency figures to be used in the modelling of the development

HVAC Plant	Baseline – 2013 L2A Limiting Values	Proposed Values
Boiler Efficiency	86%	91%
Heat Recovery Efficiency	50%	>73%
Cooling System Seasonal Energy Efficiency Ratio (SEER)	2.5	6.08
Cooling Delivery Efficiency	N/A	80%
Domestic Hot Water Efficiency	73%	95%
AHU with Heat Recovery Specific Fan Power (W/l/s)	1.8	<1.6
Local Fan Specific Fan Power (W/l/s)	0.3	0.3
Energy Efficiency Lighting Proposed	100% (all fittings will use LED, and/or fluorescent lamps)	

Table 2: Proposed Energy Saving Measures

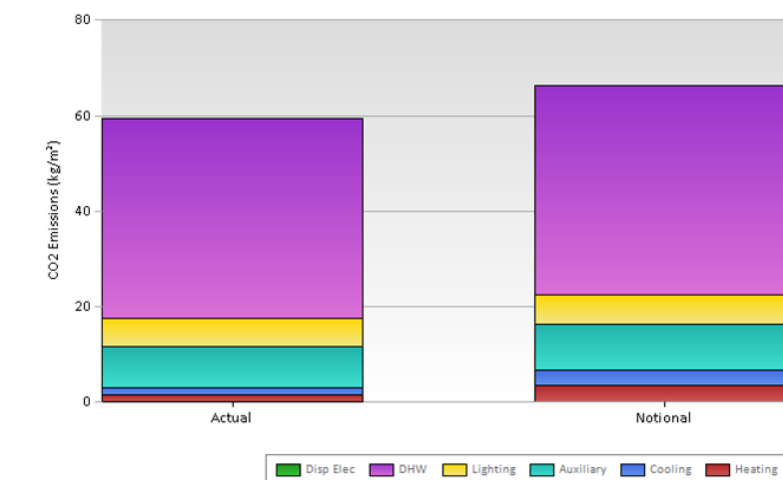
U-Values (W/m ² K)	Baseline – 2013 L2A Limiting Values	Proposed Values
Wall	0.35	0.15
Floor	0.25	0.15
Roof	0.25	0.1
Windows	2.2	0.9
Air Permeability (m ³ /h•m ² at 50Pa)	10	5

Table 3: Proposed U-Values

4.12 Calculations

The development has been modelled using the energy efficiency measures detailed above.

Tas Tas UK Building Regulations Studio
Annual CO₂ Emissions Comparison



	Actual	Notional
Heating (kgCO ₂ /m ²)	1.50	3.51
Cooling (kgCO ₂ /m ²)	1.51	3.11
Auxiliary (kgCO ₂ /m ²)	8.57	9.64
Lighting (kgCO ₂ /m ²)	5.81	6.07
DHW (kgCO ₂ /m ²)	42.02	43.86
Displaced Electricity (kgCO ₂ /m ²)	0.00	0.00
Equipment (kgCO ₂ /m ²) *	11.15	11.15
Total (kgCO₂/m²)	59.41	66.20
Total Floor Area (m²)	4858.78	4858.78

* Energy used by equipment does not contribute to total value - it is presented here for comparison only

The Building Emissions Rate (BER) achieved a predicted 10.3% reduction in CO₂ against the Part L 2013 TER from the inclusion of energy savings measures.

Model	Modelled Floor Area (m ²)	Baseline TER CO ₂ Emissions (kg/m ² /annum)	BER CO ₂ Emissions (kg/m ² /annum)	Percentage Reduction over TER
Bakers House	4,859	66.2	59.4	10.3%

Table 4: Predicted Regulated CO₂ Emissions Energy Saving Measures

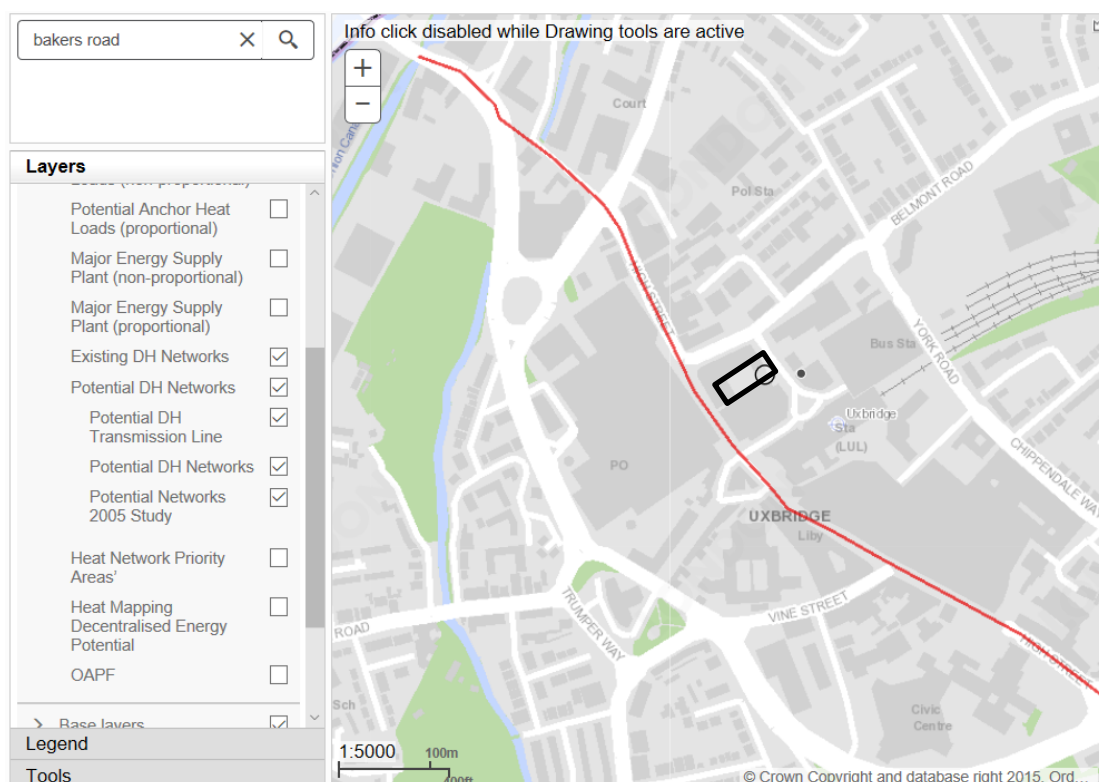
5.0 DECENTRALISED ENERGY – ‘BE CLEAN’

For commercial applications such as the proposed development, consideration should be given to the use of decentralised energy such as:

- Connection to Existing Heating or Cooling Networks
- Site-wide CHP Network

5.1 Connection to Existing Heating or Cooling Networks

The London Heat Map tool has been used to determine if there are any existing or proposed district heating schemes in close proximity for the development to utilise.



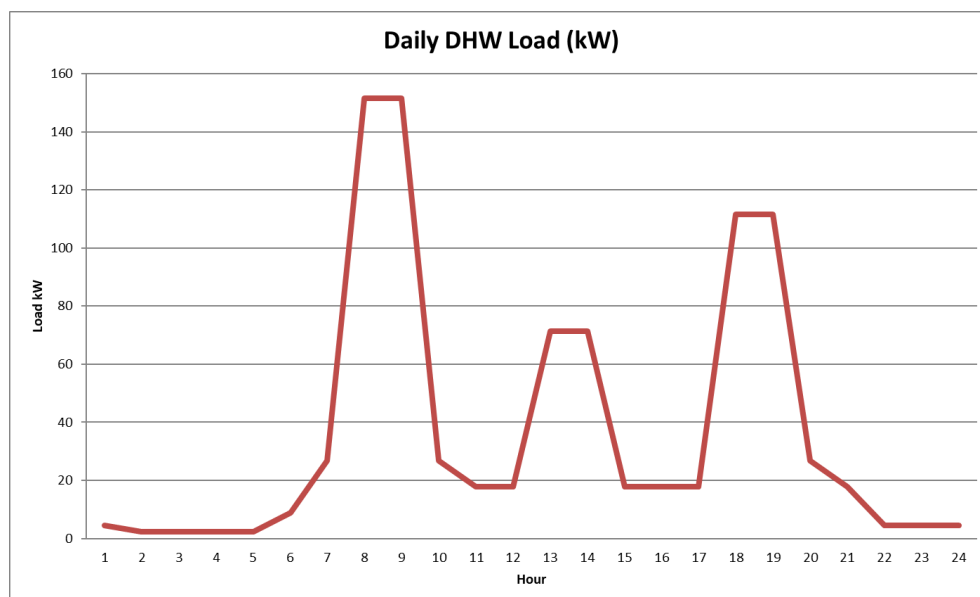
From the map, there appears to be no communal or district heating scheme in close proximity to the site at this time. However, as Uxbridge High Street has been identified as a potential district heat network then the building services systems will be designed such that connections will be achievable for any future district heating schemes.

5.2 Site Wide CHP Gas-fired CCHP/CHP Accompanied by Renewables

Gas fired CHP is a well proven technology in hotels when sized correctly and utilised to its full potential. However, the use of CCHP does not suit the proposed hotel given the relatively low cooling and heating loads and with space heating and cooling being provided from air source heat pumps, CCHP has not been

progressed. Hotels have a significant year-round DHW load which provides good potential for the installation of a CHP.

CIBSE Guide G DHW load profile has been used to determine the daily DHW demand for the hotel based on the number of occupants and predicted DHW usage which equates to 891kWh. The daily DHW profile can be defined as shown below.



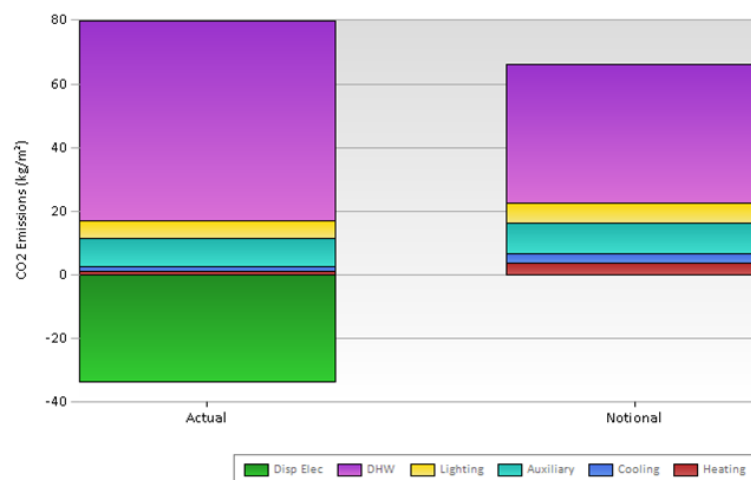
Taking into account diversity and anticipated occupancy rates of the hotel it is proposed that a 15kWe (30kWth) CHP is installed to provide the hotels base hot water demands. If the CHP unit is provided with suitable storage to enable 21 hours of operation each day, this would provide approximately 630kWh of heat a day which equates to approximately 70% of the anticipated daily DHW load. Gas fired high efficiency water heaters will be provided to offer top up/ backup services when the CHP is unable to provide the required load. From these proposals, it is proposed that a micro CHP is installed to provide the hotel's base DHW load and generate electricity to offset that taken from the grid.

If a district heating network becomes available for the site, it is proposed that when the on-site decentralised energy plant (e.g. CHP) reaches the end of its serviceable life-span (15-20 years), a feasibility study will be carried out in order to determine the viability of connecting to the district heating network, rather than replacing the CHP like for like. This report will then determine the options for replacing the CHP unit or connecting to the district heating network, to ensure the most viable and suitable solution is provided for the hotel.

5.3 Calculations Summary

The development has been modelled using a CHP to generate hot water.

Tas Tas UK Building Regulations Studio
Annual CO₂ Emissions Comparison



	Actual	Notional
Heating (kgCO ₂ /m ²)	1.21	3.51
Cooling (kgCO ₂ /m ²)	1.49	3.11
Auxiliary (kgCO ₂ /m ²)	8.57	9.64
Lighting (kgCO ₂ /m ²)	5.81	6.07
DHW (kgCO ₂ /m ²)	62.68	43.86
Displaced Electricity (kgCO ₂ /m ²)	-33.57	0.00
Equipment (kgCO ₂ /m ²) *	11.15	11.15
Total (kgCO₂/m²)	46.19	66.20
Total Floor Area (m²)	4858.78	4858.78

* Energy used by equipment does not contribute to total value - it is presented here for comparison only

The results from the modelling show the development can potentially achieve a combined 30.2% in predicted CO₂ emissions against the Baseline TER from the inclusion of CHP.

Model	Modelled Floor Area (m ²)	Baseline TER CO ₂ Emissions (kg/m ² /annum)	BER CO ₂ Emissions (kg/m ² /annum)	Percentage Reduction over TER
Bakers House	4,859	66.2	46.2	30.2%

Table 5: Predicted Regulated CO₂ Emissions Reduction from CHP

6.0 RENEWABLE AND LZC TECHNOLOGIES – ‘BE GREEN’

This section reviews the potential on-site Low or Zero Carbon (LZC) technologies available and assesses their viability in for this development.

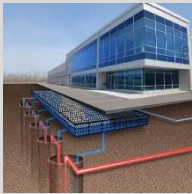
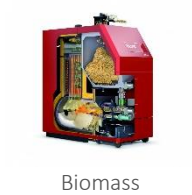
Technology	Comment	Verdict
 Solar PV	Anticipated electrical patterns of the site are likely to be constant which would lend itself to the inclusion of solar PV. Provides a good source of on-site renewable energy generation and carbon reduction. Whilst the roof space is limited, a small PV array is proposed.	✓
 Solar Thermal	The site has a high hot water demand profile and a large collector area would be required to achieve any reasonable emissions reduction which cannot be accommodated due to the limited roof space. The use of solar thermal would conflict with the proposed CHP, reducing the efficiencies of both systems and impacting the potential carbon savings.	✗
 Ground Source Heat Pump	In order to provide the anticipated loads for the development a large number of bore holes would be required which this site cannot provide given its limited footprint and surrounding area. GSHP also have large capital cost and offer minimal carbon savings compared to air source heat pumps and would conflict with the proposed CHP when used for generating domestic hot water.	✗
 Wind	Difficult to obtain good wind regime in city centre locations given turbulence created by surrounding buildings and trees etc. Additional issues associated with wind turbines are stroboscopic light, topple distance and noise which can all be deemed detrimental to neighbours.	✗
 Air Source Heat Pumps	Electric driven air source heat pumps provide an energy efficient way to heat and cool the building. VRF systems allow simultaneous heating and cooling of different spaces and the inclusion of heat recovery improves the energy efficiency and carbon reductions even further.	✓
 Biomass	Biomass introduces issues with air quality and have a large spatial requirement for plant and fuel storage. It requires a constant heat load to work effectively and efficiently as they are not designed to modulate or turn off and on quickly. This does not suit the usage pattern of the site. Biomass would also conflict with the proposed CHP and impact the efficiencies of both systems and reduce the potential carbon savings.	✗

Table 6: Renewable Energy Technologies

6.1 Heating and Cooling

Air Source Heat Pumps (ASHP) are proposed to provide space heating and cooling to all bedroom and public areas.

The benefit of cooling has been included in the earlier stages of this report as only the heating provided by ASHP is considered as renewable. Therefore, this is now included within the 'Be Green' assessment.

ASHPs are widely considered a renewable energy source as they extract thermal energy from the surrounding air which can be used to provide heating and/or cooling. It is proposed that the heating and cooling for the bedrooms will be supplied by multiple air source heat pump systems which will incorporate heat recovery technology on the indoor distribution to reduce the amount of operation required by the outdoor unit.

The heat recovery works when different areas on a system require heating and cooling at the same time by transferring the energy between these rooms i.e. heat is taken from the room that requires cooling and transferred to the room that requires heating, and vice versa.

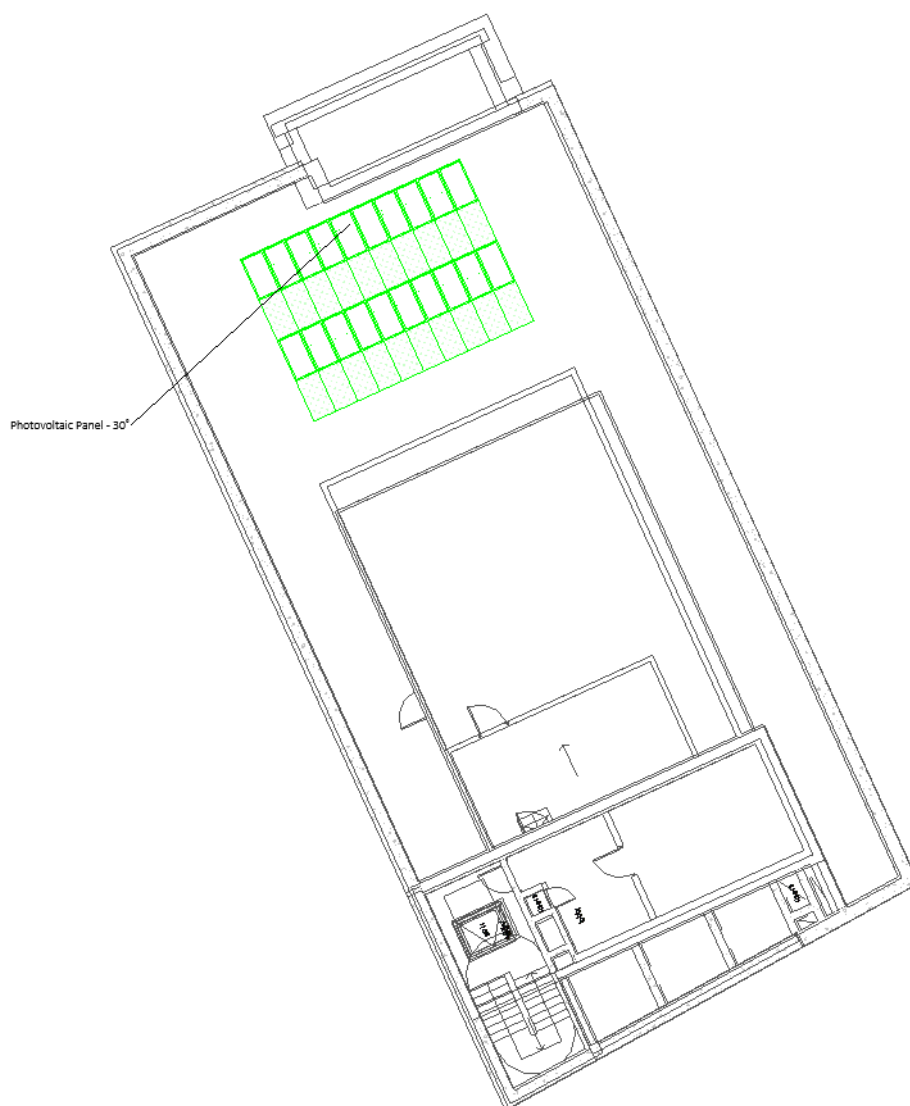
6.2 Solar Photovoltaic

It is proposed that solar PV panels will be installed on the flat roof of the building, subject to planning approval, to generate electricity and offset the energy that would have been taken from the grid.

Preliminary analysis has been carried out and shows that a solar PV array of approximately 20m² could be incorporated onto the main roof.

The panels would be mounted on a big-foot type support system and installed at 30° from the horizontal which is the most effective angle for PV in the UK.

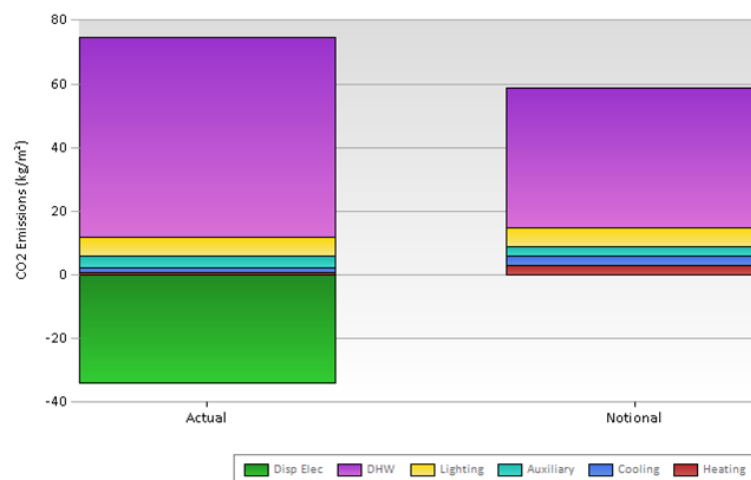
An indicative layout has been shown for the PV panels however this is subject to final agreement and approval with the planning authority as part of the overall aesthetics of the scheme.



6.3 Calculations

The development has been modelled with the inclusion of solar PV and ASHP for heating.

Tas Tas UK Building Regulations Studio
Annual CO₂ Emissions Comparison



	Actual	Notional
Heating (kgCO ₂ /m ²)	0.68	2.78
Cooling (kgCO ₂ /m ²)	1.49	3.11
Auxiliary (kgCO ₂ /m ²)	3.81	2.85
Lighting (kgCO ₂ /m ²)	5.81	6.07
DHW (kgCO ₂ /m ²)	62.68	43.86
Displaced Electricity (kgCO ₂ /m ²)	-33.92	0.00
Equipment (kgCO ₂ /m ²) *	11.15	11.15
Total (kgCO₂/m²)	40.56	58.67
Total Floor Area (m²)	4858.78	4858.78

* Energy used by equipment does not contribute to total value - it is presented here for comparison only

It should be noted that the TER shown above has changed from the Baseline TER due to the change in technologies used within the Notional building i.e. heating has changed from gas boilers to ASHP.

The results from the modelling show the development can potentially achieve an estimated overall reduction in predicted CO₂ emissions of 38.7% against the 2013 baseline TER from the inclusion of solar PV and ASHP.

Model	Modelled Floor Area (m ²)	Baseline TER CO ₂ Emissions (kg/m ² /annum)	BER CO ₂ Emissions (kg/m ² /annum)	Percentage Reduction over TER
Bakers House	4,859	66.2	40.6	38.7

Table 7: Predicted Regulated CO₂ Emissions Reduction with PV and ASHP

7.0 SUMMARY, CONCLUSIONS & RECOMMENDATIONS

Many conclusions and recommendations have been made in the previous sections of this report. In this section the main conclusions and recommendations are summarised.

The investigation of CO₂ emissions savings involved the analysis and simulation of:

- Energy Efficiency Measures
- CHP
- ASHP
- Solar PV

Table 8 below summarises the predicted CO₂ emissions for the development for each stage of the assessment:

Bakers House	CO ₂ Emissions (kgCO ₂ /m ²)	CO ₂ Emissions Savings (%)
2013 Baseline Target Emissions Rate (TER)	66.2	-
Proposed scheme after energy efficiency	59.4	10.3%
Proposed scheme after CHP	46.2	30.2%
Proposed scheme after Renewables	40.6	38.7%

Table 8: Predicted CO₂ Emissions Reduction from proposed measures

It is proposed that the following energy efficiency measures are provided to reduce energy demand for the building:

- High efficiency ASHP
- Energy efficient lighting
- Heat recovery ventilation to the guest bedrooms
- Heat Recovery ventilation to the public areas
- Improved services distribution
- Inclusion of variable speed drives on pumps and fans
- Water saving technologies

The above energy efficiency measures are predicted to provide a 10.3% reduction in CO₂ emissions over the TER.

It was deemed that inclusion of CHP was the most suitable solution to provide decentralised energy for the hotel. The onsite electricity generated and 'free heat' obtained from the CHP will provide a proportion of

domestic hot water demand for the hotel which will reduce CO₂ emissions. The CHP helped the development achieve an estimated overall 30.2% reduction in CO₂ over the TER.

Solar PV was the only suitable renewable technology to be used in conjunction with ASHPs and CHP and it is proposed that a small array is installed on the south facing flat roof, subject to planning approval. The inclusion of solar PV reduced CO₂ emissions, and resulted in an estimated final total reduction of 38.7% against the 2013 baseline target emissions.

The estimated total reduction in CO₂ emissions exceeds policy 5.2 of the London Plan 2016 by achieving over 35% against the 2013 baseline target emissions rate. Furthermore, with Hillingdon Council's own built environment policy calls for: "the reductions in carbon dioxide emission to be in line with the London Plan targets", it is deemed that this report also satisfies Hillingdon Council's energy target.

APPENDIX

Appendix A. 'Be Lean' BRUKL

Project name

Premier Inn Uxbridge

As designed

Date: Fri Aug 17 14:22:31 2018

Administrative information

Building Details

Address: ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.4.3"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.4.3

BRUKL compliance check version: v5.4.b.0

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name:

Telephone number:

Address: , ,

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	66.2
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	66.2
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	59.4
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	0.15	0.15	W02 - Blind Window 650-frame
Floor	0.25	0.15	0.15	Exposed Floor
Roof	0.25	0.1	0.1	Roof
Windows***, roof windows, and rooflights	2.2	0.9	0.9	D07 - Glazed Sliding Door
Personnel doors	2.2	1.06	1.06	D06 - Solid Door
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 -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	>0.95

1- Comms (00 Comms)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.2	4.5	-	-	-
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					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- WC MVHR (2 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	-	0.84
Standard value	0.91*	N/A	N/A	N/A	0.5
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.					

3- UA Shower (01 Staff UA/Shower)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	-	0.84
Standard value	0.91*	N/A	N/A	N/A	0.5
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.					

4- Kitchen (01 Kitchen)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	1.6	-
Standard value	0.91*	N/A	N/A	1.1^	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.					
^ 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.					

5- Retail HVAC (00 Retail Unit)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.2	4.5	-	-	0.73
Standard value	2.5*	2.6	N/A	N/A	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.					

6- Bedroom HVAC (140 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	6.08	-	-	0.82
Standard value	0.91*	3.9	N/A	N/A	0.5
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.					

7- FOH HVAC (5 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	6.08	-	-	0.84
Standard value	0.91*	3.9	N/A	N/A	0.5
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.					

8- FOH HVAC (01 Bar/Restaurant - Non-Perimeter)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	-	0.84
Standard value	0.91*	N/A	N/A	N/A	0.5
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.					

1- New HWS Circuit

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.95	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.		

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
00 Retail Unit	-	-	-	-	1.6	-	-	-	-	-	-	N/A
01 Hotel Reception	-	-	-	-	1.1	-	-	0.3	-	-	-	N/A
01 Bar/Restaurant - Perimeter	-	-	-	-	1.1	-	-	0.3	-	-	-	N/A
01 Bar/Restaurant - Non-Perimeter	-	-	-	-	1.1	-	-	0.3	-	-	-	N/A
01 Work Zone	-	-	-	-	1.1	-	-	0.3	-	-	-	N/A
01 Toilet Lobby	-	-	-	-	1.1	-	-	-	-	-	-	N/A
01 Toilets	-	-	-	-	1.1	-	-	-	-	-	-	N/A
01 Office	-	-	-	-	1.1	-	-	0.3	-	-	-	N/A
01 Team Room	-	-	-	-	1.1	-	-	0.3	-	-	-	N/A
01 Staff UA/Shower	-	-	-	-	1.1	-	-	-	-	-	-	N/A
01 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	-	N/A
01 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	-	N/A

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	
01 Bedroom 3	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
01 Bedroom 4	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
01 Bedroom 5	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
01 Bedroom 6	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
01 Bedroom 7	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 3	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 4	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 5	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 6	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 7	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 8	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 9	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 10	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 11	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 12	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 13	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 14	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 15	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 16	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 17	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 18	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 19	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
02 Bedroom 20	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 3	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 4	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 5	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 6	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 7	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 8	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 9	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 10	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 11	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 12	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 13	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 14	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 15	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 16	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 17	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 18	-	-	-	-	1.2	-	-	0.3	-	-	N/A	

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
03 Bedroom 19	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 20	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 3	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 4	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 5	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 6	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 7	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 8	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 9	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 10	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 11	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 12	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 13	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 14	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 15	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 16	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 17	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 18	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 19	-	-	-	-	1.2	-	-	0.3	-	-	N/A
04 Bedroom 20	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 3	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 4	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 5	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 6	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 7	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 8	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 9	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 10	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 11	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 12	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 13	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 14	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 15	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 16	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 17	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 18	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 19	-	-	-	-	1.2	-	-	0.3	-	-	N/A
05 Bedroom 20	-	-	-	-	1.2	-	-	0.3	-	-	N/A
06 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	N/A

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	
06 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 3	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 4	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 5	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 6	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 7	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 8	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 9	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 10	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 11	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 12	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 13	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 14	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 15	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 16	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 17	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 18	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 19	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 20	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 3	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 4	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 5	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 6	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 7	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 8	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 9	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 10	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 11	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 12	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 13	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 14	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 15	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 16	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 17	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 18	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 19	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 20	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
08 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
08 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
08 Bedroom 3	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
08 Bedroom 4	-	-	-	-	1.2	-	-	0.3	-	-	N/A	

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
08 Bedroom 5		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 6		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 7		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 8		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 9		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 10		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 11		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 12		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 13		-	-	-	-	1.2	-	-	0.3	-	-	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	
-01 Hotel Lift Lobby		-	63	-	67
-01 Plant Lobby		-	90	-	10
-01 Hotel Plant 1		90	-	-	189
-01 Hotel Plant 2		90	-	-	106
-01 Lobby 1		-	63	-	48
-01 Store 1		90	-	-	14
-01 Circulation		-	63	-	87
-01 Landlord's Use 1		90	-	-	21
-01 Landlord's Use 2		90	-	-	16
-01 Store 3		90	-	-	34
-01 Store 4		90	-	-	15
-01 Stair 1		-	79	-	41
-01 Stair 2		-	79	-	28
-01 Stair 3		-	79	-	39
-01 Store 5		90	-	-	26
00 Hotel Entrance Hall		-	63	-	79
00 Hotel Lift Lobby		-	63	-	161
00 Lobby 1		-	63	-	25
00 Comms		90	-	-	20
00 Archive		90	-	-	10
00 Linen		90	-	-	23
00 Bin Store		90	-	-	32
00 Retail Unit		-	60	22	517
00 Hotel Bins		90	-	-	30
00 Lift Pump Room		90	-	-	6
00 Hotel Servicing Area		-	90	-	46
00 Stair		-	79	-	54
00 Lobby 2		-	63	-	14
01 Hotel Reception		-	63	22	282
01 Circulation		-	63	-	77

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
01 Bar/Restaurant - Perimeter	-	63	22	403
01 Bar/Restaurant - Non-Perimeter	-	63	22	184
01 Work Zone	63	-	-	262
01 Luggage	60	-	-	13
01 Toilet Lobby	-	63	-	38
01 Toilets	-	63	-	115
01 BOH Circulation 1	-	90	-	124
01 Office	90	-	-	117
01 Store 1	90	-	-	5
01 Team Room	90	-	-	115
01 Cellar	90	-	-	14
01 Bottle Store	90	-	-	3
01 Wine Store	90	-	-	3
01 Staff UA/Shower	-	90	-	24
01 Lift Lobby	-	63	-	30
01 Kitchen	-	90	-	565
01 Store 2	90	-	-	20
01 BOH Circulation 2	-	90	-	40
01 Stair	-	79	-	78
01 Linen	90	-	-	7
01 Bedroom 1	-	63	-	71
01 Bedroom 2	-	63	-	77
01 Bedroom 3	-	63	-	71
01 Bedroom 4	-	63	-	69
01 Bedroom 5	-	63	-	66
01 Bedroom 6	-	63	-	69
01 Bedroom 7	-	63	-	67
01 Circulation 1	-	63	-	84
01 Circulation 6	-	63	-	7
02 Bedroom 1	-	63	-	60
02 Bedroom 2	-	63	-	63
02 Bedroom 3	-	63	-	60
02 Bedroom 4	-	63	-	79
02 Bedroom 5	-	63	-	54
02 Bedroom 6	-	63	-	55
02 Bedroom 7	-	63	-	57
02 Bedroom 8	-	63	-	59
02 Bedroom 9	-	63	-	60
02 Bedroom 10	-	63	-	61
02 Bedroom 11	-	63	-	55
02 Bedroom 12	-	63	-	55
02 Bedroom 13	-	63	-	63
02 Bedroom 14	-	63	-	52

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
02 Bedroom 15		-	63	-	56
02 Bedroom 16		-	63	-	56
02 Bedroom 17		-	63	-	63
02 Bedroom 18		-	63	-	61
02 Bedroom 19		-	63	-	61
02 Bedroom 20		-	63	-	77
02 Circulation 1		-	63	-	64
02 Circulation 2		-	63	-	42
02 Circulation 3		-	63	-	77
02 Circulation 4		-	63	-	75
02 Circulation 5		-	63	-	59
02 Circulation 6		-	63	-	72
02 Store 1		90	-	-	19
03 Bedroom 1		-	63	-	60
03 Bedroom 2		-	63	-	63
03 Bedroom 3		-	63	-	60
03 Bedroom 4		-	63	-	79
03 Bedroom 5		-	63	-	54
03 Bedroom 6		-	63	-	55
03 Bedroom 7		-	63	-	57
03 Bedroom 8		-	63	-	59
03 Bedroom 9		-	63	-	60
03 Bedroom 10		-	63	-	61
03 Bedroom 11		-	63	-	60
03 Bedroom 12		-	63	-	60
03 Bedroom 13		-	63	-	63
03 Bedroom 14		-	63	-	59
03 Bedroom 15		-	63	-	56
03 Bedroom 16		-	63	-	56
03 Bedroom 17		-	63	-	63
03 Bedroom 18		-	63	-	61
03 Bedroom 19		-	63	-	61
03 Bedroom 20		-	63	-	86
03 Circulation 1		-	63	-	64
03 Circulation 2		-	63	-	77
03 Circulation 3		-	63	-	42
03 Circulation 4		-	63	-	69
03 Circulation 5		-	63	-	65
03 Circulation 6		-	63	-	46
03 Store 1		90	-	-	22
04 Bedroom 1		-	63	-	60
04 Bedroom 2		-	63	-	63
04 Bedroom 3		-	63	-	60

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
04 Bedroom 4		-	63	-	79
04 Bedroom 5		-	63	-	54
04 Bedroom 6		-	63	-	55
04 Bedroom 7		-	63	-	57
04 Bedroom 8		-	63	-	59
04 Bedroom 9		-	63	-	60
04 Bedroom 10		-	63	-	61
04 Bedroom 11		-	63	-	60
04 Bedroom 12		-	63	-	60
04 Bedroom 13		-	63	-	63
04 Bedroom 14		-	63	-	59
04 Bedroom 15		-	63	-	56
04 Bedroom 16		-	63	-	56
04 Bedroom 17		-	63	-	63
04 Bedroom 18		-	63	-	61
04 Bedroom 19		-	63	-	61
04 Bedroom 20		-	63	-	77
04 Circulation 1		-	63	-	64
04 Circulation 2		-	63	-	77
04 Circulation 3		-	63	-	42
04 Circulation 4		-	63	-	75
04 Circulation 5		-	63	-	65
04 Circulation 6		-	63	-	46
04 Store 1		90	-	-	23
05 Bedroom 1		-	63	-	60
05 Bedroom 2		-	63	-	63
05 Bedroom 3		-	63	-	60
05 Bedroom 4		-	63	-	79
05 Bedroom 5		-	63	-	54
05 Bedroom 6		-	63	-	55
05 Bedroom 7		-	63	-	57
05 Bedroom 8		-	63	-	59
05 Bedroom 9		-	63	-	60
05 Bedroom 10		-	63	-	61
05 Bedroom 11		-	63	-	60
05 Bedroom 12		-	63	-	60
05 Bedroom 13		-	63	-	63
05 Bedroom 14		-	63	-	59
05 Bedroom 15		-	63	-	56
05 Bedroom 16		-	63	-	56
05 Bedroom 17		-	63	-	63
05 Bedroom 18		-	63	-	61
05 Bedroom 19		-	63	-	61

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
05 Bedroom 20		-	63	-	77
05 Circulation 1		-	63	-	64
05 Circulation 2		-	63	-	77
05 Circulation 3		-	63	-	42
05 Circulation 4		-	63	-	75
05 Circulation 5		-	63	-	65
05 Circulation 6		-	63	-	46
05 Store 1		90	-	-	23
06 Bedroom 1		-	63	-	60
06 Bedroom 2		-	63	-	63
06 Bedroom 3		-	63	-	60
06 Bedroom 4		-	63	-	79
06 Bedroom 5		-	63	-	54
06 Bedroom 6		-	63	-	55
06 Bedroom 7		-	63	-	57
06 Bedroom 8		-	63	-	59
06 Bedroom 9		-	63	-	60
06 Bedroom 10		-	63	-	61
06 Bedroom 11		-	63	-	60
06 Bedroom 12		-	63	-	60
06 Bedroom 13		-	63	-	63
06 Bedroom 14		-	63	-	59
06 Bedroom 15		-	63	-	56
06 Bedroom 16		-	63	-	56
06 Bedroom 17		-	63	-	63
06 Bedroom 18		-	63	-	61
06 Bedroom 19		-	63	-	61
06 Bedroom 20		-	63	-	77
06 Circulation 1		-	63	-	64
06 Circulation 2		-	63	-	77
06 Circulation 3		-	63	-	42
06 Circulation 4		-	63	-	75
06 Circulation 5		-	63	-	65
06 Circulation 6		-	63	-	46
06 Store 1		90	-	-	23
07 Bedroom 1		-	63	-	60
07 Bedroom 2		-	63	-	63
07 Bedroom 3		-	63	-	60
07 Bedroom 4		-	63	-	79
07 Bedroom 5		-	63	-	54
07 Bedroom 6		-	63	-	55
07 Bedroom 7		-	63	-	57
07 Bedroom 8		-	63	-	59

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
07 Bedroom 9		-	63	-	60
07 Bedroom 10		-	63	-	61
07 Bedroom 11		-	63	-	60
07 Bedroom 12		-	63	-	60
07 Bedroom 13		-	63	-	63
07 Bedroom 14		-	63	-	59
07 Bedroom 15		-	63	-	56
07 Bedroom 16		-	63	-	56
07 Bedroom 17		-	63	-	63
07 Bedroom 18		-	63	-	61
07 Bedroom 19		-	63	-	61
07 Bedroom 20		-	63	-	77
07 Circulation 1		-	63	-	64
07 Circulation 2		-	63	-	77
07 Circulation 3		-	63	-	42
07 Circulation 4		-	63	-	75
07 Circulation 5		-	63	-	65
07 Circulation 6		-	63	-	46
07 Store 1		90	-	-	23
08 Bedroom 1		-	63	-	61
08 Bedroom 2		-	63	-	62
08 Bedroom 3		-	63	-	63
08 Bedroom 4		-	63	-	62
08 Bedroom 5		-	63	-	62
08 Bedroom 6		-	63	-	65
08 Bedroom 7		-	63	-	61
08 Bedroom 8		-	63	-	58
08 Bedroom 9		-	63	-	58
08 Bedroom 10		-	63	-	65
08 Bedroom 11		-	63	-	63
08 Bedroom 12		-	63	-	62
08 Bedroom 13		-	63	-	65
08 Circulation 1		-	63	-	99
08 Circulation 2		-	63	-	63
08 Circulation 3		-	63	-	70
08 Circulation 4		-	63	-	48
08 Store 1		90	-	-	13
09 Plant		90	-	-	177
00 Circulation		-	63	-	64

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?
00 Comms	N/A	N/A
00 Retail Unit	NO (-28%)	NO
01 Hotel Reception	NO (-85%)	NO
01 Bar/Restaurant - Perimeter	YES (+14%)	NO
01 Bar/Restaurant - Non-Perimeter	NO (-22%)	NO
01 Work Zone	NO (-23%)	NO
01 Office	N/A	N/A
01 Team Room	N/A	N/A
01 Bedroom 1	NO (-90%)	NO
01 Bedroom 2	NO (-73%)	NO
01 Bedroom 3	NO (-68%)	NO
01 Bedroom 4	NO (-71%)	NO
01 Bedroom 5	NO (-92%)	NO
01 Bedroom 6	NO (-77%)	NO
01 Bedroom 7	NO (-92%)	NO
02 Bedroom 1	NO (-90%)	NO
02 Bedroom 2	NO (-73%)	NO
02 Bedroom 3	NO (-69%)	NO
02 Bedroom 4	NO (-81%)	NO
02 Bedroom 5	NO (-92%)	NO
02 Bedroom 6	NO (-77%)	NO
02 Bedroom 7	NO (-92%)	NO
02 Bedroom 8	NO (-79%)	NO
02 Bedroom 9	NO (-75%)	NO
02 Bedroom 10	NO (-74%)	NO
02 Bedroom 11	NO (-68%)	NO
02 Bedroom 12	NO (-68%)	NO
02 Bedroom 13	NO (-79%)	NO
02 Bedroom 14	NO (-76%)	NO
02 Bedroom 15	NO (-70%)	NO
02 Bedroom 16	NO (-70%)	NO
02 Bedroom 17	NO (-74%)	NO
02 Bedroom 18	NO (-74%)	NO
02 Bedroom 19	NO (-77%)	NO
02 Bedroom 20	NO (-73%)	NO
03 Bedroom 1	NO (-90%)	NO
03 Bedroom 2	NO (-73%)	NO
03 Bedroom 3	NO (-69%)	NO
03 Bedroom 4	NO (-81%)	NO
03 Bedroom 5	NO (-92%)	NO
03 Bedroom 6	NO (-77%)	NO
03 Bedroom 7	NO (-92%)	NO
03 Bedroom 8	NO (-79%)	NO
03 Bedroom 9	NO (-75%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
03 Bedroom 10	NO (-74%)	NO
03 Bedroom 11	NO (-72%)	NO
03 Bedroom 12	NO (-71%)	NO
03 Bedroom 13	NO (-89%)	NO
03 Bedroom 14	NO (-78%)	NO
03 Bedroom 15	NO (-70%)	NO
03 Bedroom 16	NO (-70%)	NO
03 Bedroom 17	NO (-74%)	NO
03 Bedroom 18	NO (-74%)	NO
03 Bedroom 19	NO (-77%)	NO
03 Bedroom 20	NO (-74%)	NO
04 Bedroom 1	NO (-90%)	NO
04 Bedroom 2	NO (-73%)	NO
04 Bedroom 3	NO (-69%)	NO
04 Bedroom 4	NO (-81%)	NO
04 Bedroom 5	NO (-92%)	NO
04 Bedroom 6	NO (-77%)	NO
04 Bedroom 7	NO (-92%)	NO
04 Bedroom 8	NO (-79%)	NO
04 Bedroom 9	NO (-75%)	NO
04 Bedroom 10	NO (-74%)	NO
04 Bedroom 11	NO (-71%)	NO
04 Bedroom 12	NO (-71%)	NO
04 Bedroom 13	NO (-89%)	NO
04 Bedroom 14	NO (-78%)	NO
04 Bedroom 15	NO (-70%)	NO
04 Bedroom 16	NO (-70%)	NO
04 Bedroom 17	NO (-74%)	NO
04 Bedroom 18	NO (-74%)	NO
04 Bedroom 19	NO (-77%)	NO
04 Bedroom 20	NO (-74%)	NO
05 Bedroom 1	NO (-90%)	NO
05 Bedroom 2	NO (-73%)	NO
05 Bedroom 3	NO (-69%)	NO
05 Bedroom 4	NO (-81%)	NO
05 Bedroom 5	NO (-92%)	NO
05 Bedroom 6	NO (-77%)	NO
05 Bedroom 7	NO (-92%)	NO
05 Bedroom 8	NO (-78%)	NO
05 Bedroom 9	NO (-74%)	NO
05 Bedroom 10	NO (-73%)	NO
05 Bedroom 11	NO (-71%)	NO
05 Bedroom 12	NO (-71%)	NO
05 Bedroom 13	NO (-89%)	NO
05 Bedroom 14	NO (-78%)	NO
05 Bedroom 15	NO (-70%)	NO
05 Bedroom 16	NO (-70%)	NO
05 Bedroom 17	NO (-74%)	NO
05 Bedroom 18	NO (-74%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
05 Bedroom 19	NO (-77%)	NO
05 Bedroom 20	NO (-74%)	NO
06 Bedroom 1	NO (-90%)	NO
06 Bedroom 2	NO (-73%)	NO
06 Bedroom 3	NO (-69%)	NO
06 Bedroom 4	NO (-81%)	NO
06 Bedroom 5	NO (-92%)	NO
06 Bedroom 6	NO (-77%)	NO
06 Bedroom 7	NO (-92%)	NO
06 Bedroom 8	NO (-77%)	NO
06 Bedroom 9	NO (-72%)	NO
06 Bedroom 10	NO (-72%)	NO
06 Bedroom 11	NO (-71%)	NO
06 Bedroom 12	NO (-71%)	NO
06 Bedroom 13	NO (-89%)	NO
06 Bedroom 14	NO (-78%)	NO
06 Bedroom 15	NO (-70%)	NO
06 Bedroom 16	NO (-70%)	NO
06 Bedroom 17	NO (-74%)	NO
06 Bedroom 18	NO (-73%)	NO
06 Bedroom 19	NO (-77%)	NO
06 Bedroom 20	NO (-74%)	NO
07 Bedroom 1	NO (-90%)	NO
07 Bedroom 2	NO (-73%)	NO
07 Bedroom 3	NO (-69%)	NO
07 Bedroom 4	NO (-81%)	NO
07 Bedroom 5	NO (-92%)	NO
07 Bedroom 6	NO (-77%)	NO
07 Bedroom 7	NO (-92%)	NO
07 Bedroom 8	NO (-70%)	NO
07 Bedroom 9	NO (-71%)	NO
07 Bedroom 10	NO (-72%)	NO
07 Bedroom 11	NO (-71%)	NO
07 Bedroom 12	NO (-71%)	NO
07 Bedroom 13	NO (-89%)	NO
07 Bedroom 14	NO (-78%)	NO
07 Bedroom 15	NO (-70%)	NO
07 Bedroom 16	NO (-70%)	NO
07 Bedroom 17	NO (-74%)	NO
07 Bedroom 18	NO (-73%)	NO
07 Bedroom 19	NO (-76%)	NO
07 Bedroom 20	NO (-74%)	NO
08 Bedroom 1	NO (-70%)	NO
08 Bedroom 2	NO (-71%)	NO
08 Bedroom 3	NO (-72%)	NO
08 Bedroom 4	NO (-71%)	NO
08 Bedroom 5	NO (-71%)	NO
08 Bedroom 6	NO (-89%)	NO
08 Bedroom 7	NO (-78%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
08 Bedroom 8	NO (-70%)	NO
08 Bedroom 9	NO (-70%)	NO
08 Bedroom 10	NO (-74%)	NO
08 Bedroom 11	NO (-73%)	NO
08 Bedroom 12	NO (-73%)	NO
08 Bedroom 13	NO (-89%)	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]	4859	4859
External area [m ²]	6246	6246
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	5	3
Average conductance [W/K]	2040	3767
Average U-value [W/m ² K]	0.33	0.6
Alpha value* [%]	14.42	14.42

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

Building Use

% Area Building Type

1	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
99	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	6.92	16.21
Cooling	2.99	6.14
Auxiliary	16.94	19.04
Lighting	11.49	12
Hot water	194.52	203.07
Equipment*	22.04	22.04
TOTAL **	232.85	256.47

* 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]	76.86	134.42
Primary energy* [kWh/m ²]	339.8	378.91
Total emissions [kg/m ²]	59.4	66.2

* 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	1.2	949.1	0.1	73.2	0	3.36	3.6	4.2	4.5	
Notional	67.5	947.5	7.7	73.1	0	2.43	3.6	----	----	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	0.4	0	0.1	0	10.7	0.86	0	0.91	0	
Notional	9.9	0	3.4	0	14	0.82	0	----	----	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	6.5	0	2.1	0	8.1	0.86	0	0.91	0	
Notional	6.8	0	2.3	0	13.4	0.82	0	----	----	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	2	0	0.7	0	33.7	0.86	0	0.91	0	
Notional	0	0	0	0	24.2	0	0	----	----	
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
Actual	20.1	390.2	1.7	30.1	7.5	3.36	3.6	4.2	4.5	
Notional	70.4	261.1	8.1	20.2	4.4	2.43	3.6	----	----	
[ST] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	34.4	25.4	11.1	1.5	23.9	0.86	4.86	0.91	6.08	
Notional	75	65.4	25.5	5.1	28.9	0.82	3.6	----	----	
[ST] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	16.4	705.6	5.3	40.3	33.6	0.86	4.86	0.91	6.08	
Notional	23.8	805.9	8.1	62.2	27.8	0.82	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 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	0.15	External Wall
Floor	0.2	0.15	Ground Floor
Roof	0.15	0.1	Roof
Windows, roof windows, and rooflights	1.5	0.9	W21 - Fixed Glazing
Personnel doors	1.5	1.03	D05 - Solid Door
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-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

Appendix B. 'Be Clean' BRUKL

Project name

Premier Inn Uxbridge**As designed****Date:** Fri Aug 17 14:57:08 2018**Administrative information****Building Details**

Address: ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.4.3"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.4.3

BRUKL compliance check version: v5.4.b.0

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name:

Telephone number:

Address: , ,

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	66.2
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	66.2
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	46.2
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	0.15	0.15	W02 - Blind Window 650-frame
Floor	0.25	0.15	0.15	Exposed Floor
Roof	0.25	0.1	0.1	Roof
Windows***, roof windows, and rooflights	2.2	0.9	0.9	D07 - Glazed Sliding Door
Personnel doors	2.2	1.06	1.06	D06 - Solid Door
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 -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	>0.95

1- Comms (00 Comms)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0	4.5	-	-	-
Standard value	N/A	2.6	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

2- WC MVHR (2 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	-	0.84
Standard value	0.91*	N/A	N/A	N/A	0.5
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.					

3- UA Shower (01 Staff UA/Shower)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	-	0.84
Standard value	0.91*	N/A	N/A	N/A	0.5
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.					

4- Kitchen (01 Kitchen)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	1.6	-
Standard value	0.91*	N/A	N/A	1.1^	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.					
^ 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.					

5- Retail HVAC (00 Retail Unit)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.2	4.5	-	-	0.73
Standard value	2.5*	2.6	N/A	N/A	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.					

6- Bedroom HVAC (140 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	6.08	-	-	0.82
Standard value	0.91*	2.55	N/A	N/A	0.5
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.					

7- FOH HVAC (5 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	6.08	-	-	0.84
Standard value	0.91*	2.55	N/A	N/A	0.5
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.					

8- FOH HVAC (01 Bar/Restaurant - Non-Perimeter)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	-	0.84
Standard value	0.91*	N/A	N/A	N/A	0.5
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.					

1- New HWS Circuit

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.95	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.		

1- New Heating Circuit

	CHPQA quality index	CHP electrical efficiency
This building	134	0.28
Standard value	105	0.2

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		
00 Retail Unit		-	-	-	-	1.6	-	-	-	-	-	N/A
01 Hotel Reception		-	-	-	-	1.1	-	-	0.3	-	-	N/A
01 Bar/Restaurant - Perimeter		-	-	-	-	1.1	-	-	0.3	-	-	N/A
01 Bar/Restaurant - Non-Perimeter		-	-	-	-	1.1	-	-	0.3	-	-	N/A
01 Work Zone		-	-	-	-	1.1	-	-	0.3	-	-	N/A
01 Office		-	-	-	-	1.1	-	-	0.3	-	-	N/A
01 Team Room		-	-	-	-	1.1	-	-	0.3	-	-	N/A

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
01 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	N/A
01 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	N/A
01 Bedroom 3	-	-	-	-	1.2	-	-	0.3	-	-	N/A
01 Bedroom 4	-	-	-	-	1.2	-	-	0.3	-	-	N/A
01 Bedroom 5	-	-	-	-	1.2	-	-	0.3	-	-	N/A
01 Bedroom 6	-	-	-	-	1.2	-	-	0.3	-	-	N/A
01 Bedroom 7	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 3	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 4	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 5	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 6	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 7	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 8	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 9	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 10	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 11	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 12	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 13	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 14	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 15	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 16	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 17	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 18	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 19	-	-	-	-	1.2	-	-	0.3	-	-	N/A
02 Bedroom 20	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 3	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 4	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 5	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 6	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 7	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 8	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 9	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 10	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 11	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 12	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 13	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 14	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 15	-	-	-	-	1.2	-	-	0.3	-	-	N/A
03 Bedroom 16	-	-	-	-	1.2	-	-	0.3	-	-	N/A

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	
03 Bedroom 17	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 18	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 19	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
03 Bedroom 20	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 3	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 4	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 5	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 6	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 7	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 8	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 9	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 10	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 11	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 12	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 13	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 14	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 15	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 16	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 17	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 18	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 19	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
04 Bedroom 20	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 3	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 4	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 5	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 6	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 7	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 8	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 9	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 10	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 11	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 12	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 13	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 14	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 15	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 16	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 17	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 18	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
05 Bedroom 19	-	-	-	-	1.2	-	-	0.3	-	-	N/A	

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	
05 Bedroom 20	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 3	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 4	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 5	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 6	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 7	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 8	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 9	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 10	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 11	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 12	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 13	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 14	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 15	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 16	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 17	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 18	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 19	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
06 Bedroom 20	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 3	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 4	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 5	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 6	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 7	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 8	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 9	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 10	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 11	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 12	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 13	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 14	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 15	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 16	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 17	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 18	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 19	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
07 Bedroom 20	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
08 Bedroom 1	-	-	-	-	1.2	-	-	0.3	-	-	N/A	
08 Bedroom 2	-	-	-	-	1.2	-	-	0.3	-	-	N/A	

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
08 Bedroom 3		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 4		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 5		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 6		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 7		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 8		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 9		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 10		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 11		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 12		-	-	-	-	1.2	-	-	0.3	-	-	N/A
08 Bedroom 13		-	-	-	-	1.2	-	-	0.3	-	-	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	
-01 Hotel Lift Lobby		-	63	-	67
-01 Plant Lobby		-	90	-	10
-01 Hotel Plant 1		90	-	-	189
-01 Hotel Plant 2		90	-	-	106
-01 Lobby 1		-	63	-	48
-01 Store 1		90	-	-	14
-01 Circulation		-	63	-	87
-01 Landlord's Use 1		90	-	-	21
-01 Landlord's Use 2		90	-	-	16
-01 Store 3		90	-	-	34
-01 Store 4		90	-	-	15
-01 Stair 1		-	79	-	41
-01 Stair 2		-	79	-	28
-01 Stair 3		-	79	-	39
-01 Store 5		90	-	-	26
00 Hotel Entrance Hall		-	63	-	79
00 Hotel Lift Lobby		-	63	-	161
00 Lobby 1		-	63	-	25
00 Comms		90	-	-	20
00 Archive		90	-	-	10
00 Linen		90	-	-	23
00 Bin Store		90	-	-	32
00 Retail Unit		-	60	22	517
00 Hotel Bins		90	-	-	30
00 Lift Pump Room		90	-	-	6
00 Hotel Servicing Area		-	90	-	46
00 Stair		-	79	-	54
00 Lobby 2		-	63	-	14

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
01 Hotel Reception		-	63	22	282
01 Circulation		-	63	-	77
01 Bar/Restaurant - Perimeter		-	63	22	403
01 Bar/Restaurant - Non-Perimeter		-	63	22	184
01 Work Zone		63	-	-	262
01 Luggage		60	-	-	13
01 Toilet Lobby		-	63	-	38
01 Toilets		-	63	-	115
01 BOH Circulation 1		-	90	-	124
01 Office		90	-	-	117
01 Store 1		90	-	-	5
01 Team Room		90	-	-	115
01 Cellar		90	-	-	14
01 Bottle Store		90	-	-	3
01 Wine Store		90	-	-	3
01 Staff UA/Shower		-	90	-	24
01 Lift Lobby		-	63	-	30
01 Kitchen		-	90	-	565
01 Store 2		90	-	-	20
01 BOH Circulation 2		-	90	-	40
01 Stair		-	79	-	78
01 Linen		90	-	-	7
01 Bedroom 1		-	63	-	71
01 Bedroom 2		-	63	-	77
01 Bedroom 3		-	63	-	71
01 Bedroom 4		-	63	-	69
01 Bedroom 5		-	63	-	66
01 Bedroom 6		-	63	-	69
01 Bedroom 7		-	63	-	67
01 Circulation 1		-	63	-	84
01 Circulation 6		-	63	-	7
02 Bedroom 1		-	63	-	60
02 Bedroom 2		-	63	-	63
02 Bedroom 3		-	63	-	60
02 Bedroom 4		-	63	-	79
02 Bedroom 5		-	63	-	54
02 Bedroom 6		-	63	-	55
02 Bedroom 7		-	63	-	57
02 Bedroom 8		-	63	-	59
02 Bedroom 9		-	63	-	60
02 Bedroom 10		-	63	-	61
02 Bedroom 11		-	63	-	55
02 Bedroom 12		-	63	-	55

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
02 Bedroom 13		-	63	-	63
02 Bedroom 14		-	63	-	52
02 Bedroom 15		-	63	-	56
02 Bedroom 16		-	63	-	56
02 Bedroom 17		-	63	-	63
02 Bedroom 18		-	63	-	61
02 Bedroom 19		-	63	-	61
02 Bedroom 20		-	63	-	77
02 Circulation 1		-	63	-	64
02 Circulation 2		-	63	-	42
02 Circulation 3		-	63	-	77
02 Circulation 4		-	63	-	75
02 Circulation 5		-	63	-	59
02 Circulation 6		-	63	-	72
02 Store 1		90	-	-	19
03 Bedroom 1		-	63	-	60
03 Bedroom 2		-	63	-	63
03 Bedroom 3		-	63	-	60
03 Bedroom 4		-	63	-	79
03 Bedroom 5		-	63	-	54
03 Bedroom 6		-	63	-	55
03 Bedroom 7		-	63	-	57
03 Bedroom 8		-	63	-	59
03 Bedroom 9		-	63	-	60
03 Bedroom 10		-	63	-	61
03 Bedroom 11		-	63	-	60
03 Bedroom 12		-	63	-	60
03 Bedroom 13		-	63	-	63
03 Bedroom 14		-	63	-	59
03 Bedroom 15		-	63	-	56
03 Bedroom 16		-	63	-	56
03 Bedroom 17		-	63	-	63
03 Bedroom 18		-	63	-	61
03 Bedroom 19		-	63	-	61
03 Bedroom 20		-	63	-	86
03 Circulation 1		-	63	-	64
03 Circulation 2		-	63	-	77
03 Circulation 3		-	63	-	42
03 Circulation 4		-	63	-	69
03 Circulation 5		-	63	-	65
03 Circulation 6		-	63	-	46
03 Store 1		90	-	-	22
04 Bedroom 1		-	63	-	60

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
04 Bedroom 2		-	63	-	63
04 Bedroom 3		-	63	-	60
04 Bedroom 4		-	63	-	79
04 Bedroom 5		-	63	-	54
04 Bedroom 6		-	63	-	55
04 Bedroom 7		-	63	-	57
04 Bedroom 8		-	63	-	59
04 Bedroom 9		-	63	-	60
04 Bedroom 10		-	63	-	61
04 Bedroom 11		-	63	-	60
04 Bedroom 12		-	63	-	60
04 Bedroom 13		-	63	-	63
04 Bedroom 14		-	63	-	59
04 Bedroom 15		-	63	-	56
04 Bedroom 16		-	63	-	56
04 Bedroom 17		-	63	-	63
04 Bedroom 18		-	63	-	61
04 Bedroom 19		-	63	-	61
04 Bedroom 20		-	63	-	77
04 Circulation 1		-	63	-	64
04 Circulation 2		-	63	-	77
04 Circulation 3		-	63	-	42
04 Circulation 4		-	63	-	75
04 Circulation 5		-	63	-	65
04 Circulation 6		-	63	-	46
04 Store 1		90	-	-	23
05 Bedroom 1		-	63	-	60
05 Bedroom 2		-	63	-	63
05 Bedroom 3		-	63	-	60
05 Bedroom 4		-	63	-	79
05 Bedroom 5		-	63	-	54
05 Bedroom 6		-	63	-	55
05 Bedroom 7		-	63	-	57
05 Bedroom 8		-	63	-	59
05 Bedroom 9		-	63	-	60
05 Bedroom 10		-	63	-	61
05 Bedroom 11		-	63	-	60
05 Bedroom 12		-	63	-	60
05 Bedroom 13		-	63	-	63
05 Bedroom 14		-	63	-	59
05 Bedroom 15		-	63	-	56
05 Bedroom 16		-	63	-	56
05 Bedroom 17		-	63	-	63

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
05 Bedroom 18		-	63	-	61
05 Bedroom 19		-	63	-	61
05 Bedroom 20		-	63	-	77
05 Circulation 1		-	63	-	64
05 Circulation 2		-	63	-	77
05 Circulation 3		-	63	-	42
05 Circulation 4		-	63	-	75
05 Circulation 5		-	63	-	65
05 Circulation 6		-	63	-	46
05 Store 1		90	-	-	23
06 Bedroom 1		-	63	-	60
06 Bedroom 2		-	63	-	63
06 Bedroom 3		-	63	-	60
06 Bedroom 4		-	63	-	79
06 Bedroom 5		-	63	-	54
06 Bedroom 6		-	63	-	55
06 Bedroom 7		-	63	-	57
06 Bedroom 8		-	63	-	59
06 Bedroom 9		-	63	-	60
06 Bedroom 10		-	63	-	61
06 Bedroom 11		-	63	-	60
06 Bedroom 12		-	63	-	60
06 Bedroom 13		-	63	-	63
06 Bedroom 14		-	63	-	59
06 Bedroom 15		-	63	-	56
06 Bedroom 16		-	63	-	56
06 Bedroom 17		-	63	-	63
06 Bedroom 18		-	63	-	61
06 Bedroom 19		-	63	-	61
06 Bedroom 20		-	63	-	77
06 Circulation 1		-	63	-	64
06 Circulation 2		-	63	-	77
06 Circulation 3		-	63	-	42
06 Circulation 4		-	63	-	75
06 Circulation 5		-	63	-	65
06 Circulation 6		-	63	-	46
06 Store 1		90	-	-	23
07 Bedroom 1		-	63	-	60
07 Bedroom 2		-	63	-	63
07 Bedroom 3		-	63	-	60
07 Bedroom 4		-	63	-	79
07 Bedroom 5		-	63	-	54
07 Bedroom 6		-	63	-	55

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
07 Bedroom 7		-	63	-	57
07 Bedroom 8		-	63	-	59
07 Bedroom 9		-	63	-	60
07 Bedroom 10		-	63	-	61
07 Bedroom 11		-	63	-	60
07 Bedroom 12		-	63	-	60
07 Bedroom 13		-	63	-	63
07 Bedroom 14		-	63	-	59
07 Bedroom 15		-	63	-	56
07 Bedroom 16		-	63	-	56
07 Bedroom 17		-	63	-	63
07 Bedroom 18		-	63	-	61
07 Bedroom 19		-	63	-	61
07 Bedroom 20		-	63	-	77
07 Circulation 1		-	63	-	64
07 Circulation 2		-	63	-	77
07 Circulation 3		-	63	-	42
07 Circulation 4		-	63	-	75
07 Circulation 5		-	63	-	65
07 Circulation 6		-	63	-	46
07 Store 1		90	-	-	23
08 Bedroom 1		-	63	-	61
08 Bedroom 2		-	63	-	62
08 Bedroom 3		-	63	-	63
08 Bedroom 4		-	63	-	62
08 Bedroom 5		-	63	-	62
08 Bedroom 6		-	63	-	65
08 Bedroom 7		-	63	-	61
08 Bedroom 8		-	63	-	58
08 Bedroom 9		-	63	-	58
08 Bedroom 10		-	63	-	65
08 Bedroom 11		-	63	-	63
08 Bedroom 12		-	63	-	62
08 Bedroom 13		-	63	-	65
08 Circulation 1		-	63	-	99
08 Circulation 2		-	63	-	63
08 Circulation 3		-	63	-	70
08 Circulation 4		-	63	-	48
08 Store 1		90	-	-	13
09 Plant		90	-	-	177
00 Circulation		-	63	-	64

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?
00 Comms	N/A	N/A
00 Retail Unit	NO (-28%)	NO
01 Hotel Reception	NO (-85%)	NO
01 Bar/Restaurant - Perimeter	YES (+14%)	NO
01 Bar/Restaurant - Non-Perimeter	NO (-22%)	NO
01 Work Zone	NO (-23%)	NO
01 Office	N/A	N/A
01 Team Room	N/A	N/A
01 Bedroom 1	NO (-90%)	NO
01 Bedroom 2	NO (-73%)	NO
01 Bedroom 3	NO (-68%)	NO
01 Bedroom 4	NO (-71%)	NO
01 Bedroom 5	NO (-92%)	NO
01 Bedroom 6	NO (-77%)	NO
01 Bedroom 7	NO (-92%)	NO
02 Bedroom 1	NO (-90%)	NO
02 Bedroom 2	NO (-73%)	NO
02 Bedroom 3	NO (-69%)	NO
02 Bedroom 4	NO (-81%)	NO
02 Bedroom 5	NO (-92%)	NO
02 Bedroom 6	NO (-77%)	NO
02 Bedroom 7	NO (-92%)	NO
02 Bedroom 8	NO (-79%)	NO
02 Bedroom 9	NO (-75%)	NO
02 Bedroom 10	NO (-74%)	NO
02 Bedroom 11	NO (-68%)	NO
02 Bedroom 12	NO (-68%)	NO
02 Bedroom 13	NO (-79%)	NO
02 Bedroom 14	NO (-76%)	NO
02 Bedroom 15	NO (-70%)	NO
02 Bedroom 16	NO (-70%)	NO
02 Bedroom 17	NO (-74%)	NO
02 Bedroom 18	NO (-74%)	NO
02 Bedroom 19	NO (-77%)	NO
02 Bedroom 20	NO (-73%)	NO
03 Bedroom 1	NO (-90%)	NO
03 Bedroom 2	NO (-73%)	NO
03 Bedroom 3	NO (-69%)	NO
03 Bedroom 4	NO (-81%)	NO
03 Bedroom 5	NO (-92%)	NO
03 Bedroom 6	NO (-77%)	NO
03 Bedroom 7	NO (-92%)	NO
03 Bedroom 8	NO (-79%)	NO
03 Bedroom 9	NO (-75%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
03 Bedroom 10	NO (-74%)	NO
03 Bedroom 11	NO (-72%)	NO
03 Bedroom 12	NO (-71%)	NO
03 Bedroom 13	NO (-89%)	NO
03 Bedroom 14	NO (-78%)	NO
03 Bedroom 15	NO (-70%)	NO
03 Bedroom 16	NO (-70%)	NO
03 Bedroom 17	NO (-74%)	NO
03 Bedroom 18	NO (-74%)	NO
03 Bedroom 19	NO (-77%)	NO
03 Bedroom 20	NO (-74%)	NO
04 Bedroom 1	NO (-90%)	NO
04 Bedroom 2	NO (-73%)	NO
04 Bedroom 3	NO (-69%)	NO
04 Bedroom 4	NO (-81%)	NO
04 Bedroom 5	NO (-92%)	NO
04 Bedroom 6	NO (-77%)	NO
04 Bedroom 7	NO (-92%)	NO
04 Bedroom 8	NO (-79%)	NO
04 Bedroom 9	NO (-75%)	NO
04 Bedroom 10	NO (-74%)	NO
04 Bedroom 11	NO (-71%)	NO
04 Bedroom 12	NO (-71%)	NO
04 Bedroom 13	NO (-89%)	NO
04 Bedroom 14	NO (-78%)	NO
04 Bedroom 15	NO (-70%)	NO
04 Bedroom 16	NO (-70%)	NO
04 Bedroom 17	NO (-74%)	NO
04 Bedroom 18	NO (-74%)	NO
04 Bedroom 19	NO (-77%)	NO
04 Bedroom 20	NO (-74%)	NO
05 Bedroom 1	NO (-90%)	NO
05 Bedroom 2	NO (-73%)	NO
05 Bedroom 3	NO (-69%)	NO
05 Bedroom 4	NO (-81%)	NO
05 Bedroom 5	NO (-92%)	NO
05 Bedroom 6	NO (-77%)	NO
05 Bedroom 7	NO (-92%)	NO
05 Bedroom 8	NO (-78%)	NO
05 Bedroom 9	NO (-74%)	NO
05 Bedroom 10	NO (-73%)	NO
05 Bedroom 11	NO (-71%)	NO
05 Bedroom 12	NO (-71%)	NO
05 Bedroom 13	NO (-89%)	NO
05 Bedroom 14	NO (-78%)	NO
05 Bedroom 15	NO (-70%)	NO
05 Bedroom 16	NO (-70%)	NO
05 Bedroom 17	NO (-74%)	NO
05 Bedroom 18	NO (-74%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
05 Bedroom 19	NO (-77%)	NO
05 Bedroom 20	NO (-74%)	NO
06 Bedroom 1	NO (-90%)	NO
06 Bedroom 2	NO (-73%)	NO
06 Bedroom 3	NO (-69%)	NO
06 Bedroom 4	NO (-81%)	NO
06 Bedroom 5	NO (-92%)	NO
06 Bedroom 6	NO (-77%)	NO
06 Bedroom 7	NO (-92%)	NO
06 Bedroom 8	NO (-77%)	NO
06 Bedroom 9	NO (-72%)	NO
06 Bedroom 10	NO (-72%)	NO
06 Bedroom 11	NO (-71%)	NO
06 Bedroom 12	NO (-71%)	NO
06 Bedroom 13	NO (-89%)	NO
06 Bedroom 14	NO (-78%)	NO
06 Bedroom 15	NO (-70%)	NO
06 Bedroom 16	NO (-70%)	NO
06 Bedroom 17	NO (-74%)	NO
06 Bedroom 18	NO (-73%)	NO
06 Bedroom 19	NO (-77%)	NO
06 Bedroom 20	NO (-74%)	NO
07 Bedroom 1	NO (-90%)	NO
07 Bedroom 2	NO (-73%)	NO
07 Bedroom 3	NO (-69%)	NO
07 Bedroom 4	NO (-81%)	NO
07 Bedroom 5	NO (-92%)	NO
07 Bedroom 6	NO (-77%)	NO
07 Bedroom 7	NO (-92%)	NO
07 Bedroom 8	NO (-70%)	NO
07 Bedroom 9	NO (-71%)	NO
07 Bedroom 10	NO (-72%)	NO
07 Bedroom 11	NO (-71%)	NO
07 Bedroom 12	NO (-71%)	NO
07 Bedroom 13	NO (-89%)	NO
07 Bedroom 14	NO (-78%)	NO
07 Bedroom 15	NO (-70%)	NO
07 Bedroom 16	NO (-70%)	NO
07 Bedroom 17	NO (-74%)	NO
07 Bedroom 18	NO (-73%)	NO
07 Bedroom 19	NO (-76%)	NO
07 Bedroom 20	NO (-74%)	NO
08 Bedroom 1	NO (-70%)	NO
08 Bedroom 2	NO (-71%)	NO
08 Bedroom 3	NO (-72%)	NO
08 Bedroom 4	NO (-71%)	NO
08 Bedroom 5	NO (-71%)	NO
08 Bedroom 6	NO (-89%)	NO
08 Bedroom 7	NO (-78%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
08 Bedroom 8	NO (-70%)	NO
08 Bedroom 9	NO (-70%)	NO
08 Bedroom 10	NO (-74%)	NO
08 Bedroom 11	NO (-73%)	NO
08 Bedroom 12	NO (-73%)	NO
08 Bedroom 13	NO (-89%)	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]	4859	4859
External area [m ²]	6246	6246
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	5	3
Average conductance [W/K]	2040	3767
Average U-value [W/m ² K]	0.33	0.6
Alpha value* [%]	14.42	14.42

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

Building Use

% Area Building Type

1	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
99	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	5.58	16.21
Cooling	2.94	6.14
Auxiliary	16.94	19.04
Lighting	11.49	12
Hot water	290.16	203.08
Equipment*	22.04	22.04
TOTAL **	262.43	256.47

* 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	64.67	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	71.5	134.42
Primary energy* [kWh/m ²]	256.16	378.92
Total emissions [kg/m ²]	46.2	66.2

* 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	0	1224.8	0	94.5	0	0	3.6	0	4.5	
Notional	67.5	947.5	7.7	73.1	0	2.43	3.6	----	----	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	0	0	0	0	10.7	0.86	0	0.91	0	
Notional	9.9	0	3.4	0	14	0.82	0	----	----	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	3.7	0	1.2	0	8.1	0.86	0	0.91	0	
Notional	6.8	0	2.3	0	13.4	0.82	0	----	----	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	0.1	0	0	0	33.7	0.86	0	0.91	0	
Notional	0	0	0	0	24.2	0	0	----	----	
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
Actual	17.6	414	1.5	31.9	7.5	3.36	3.6	4.2	4.5	
Notional	70.4	261.1	8.1	20.2	4.4	2.43	3.6	----	----	
[ST] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	27.6	24.9	8.9	1.4	23.9	0.86	4.86	0.91	6.08	
Notional	75	65.4	25.5	5.1	28.9	0.82	3.6	----	----	
[ST] Fan coil systems, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	15.7	686	5	39.2	33.6	0.86	4.86	0.91	6.08	
Notional	23.8	805.9	8.1	62.2	27.8	0.82	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 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	0.15	External Wall
Floor	0.2	0.15	Ground Floor
Roof	0.15	0.1	Roof
Windows, roof windows, and rooflights	1.5	0.9	W21 - Fixed Glazing
Personnel doors	1.5	1.03	D05 - Solid Door
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-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

Appendix C. 'Be Green' BRUKL

Project name

Premier Inn Uxbridge

As designed

Date: Fri Aug 17 16:54:46 2018

Administrative information

Building Details

Address: ,

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.4.3"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.4.3

BRUKL compliance check version: v5.4.b.0

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name:

Telephone number:

Address: , ,

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	58.7
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	58.7
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	40.6
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	0.15	0.15	W02 - Blind Window 650-frame
Floor	0.25	0.15	0.15	Exposed Floor
Roof	0.25	0.1	0.1	Roof
Windows***, roof windows, and rooflights	2.2	0.9	0.9	D07 - Glazed Sliding Door
Personnel doors	2.2	1.06	1.06	D06 - Solid Door
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 -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	>0.95

1- Comms (00 Comms)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0	4.5	-	-	-
Standard value	N/A	2.6	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES

2- WC MVHR (2 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.49	-	-	-	0.84
Standard value	0.91*	N/A	N/A	N/A	0.5
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.					

3- UA Shower (01 Staff UA/Shower)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.49	-	-	-	0.84
Standard value	0.91*	N/A	N/A	N/A	0.5
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.					

4- Kitchen (01 Kitchen)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.49	-	-	1.6	-
Standard value	0.91*	N/A	N/A	1.1^	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.					
^ 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.					

5- Retail HVAC (00 Retail Unit)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.2	4.5	-	-	0.73
Standard value	2.5*	2.6	N/A	N/A	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.					

6- Bedroom HVAC (140 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.49	6.08	-	-	0.82
Standard value	0.91*	2.55	N/A	N/A	0.5
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.					

7- FOH HVAC (5 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.49	6.08	-	-	0.84
Standard value	0.91*	2.55	N/A	N/A	0.5
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.					

8- FOH HVAC (01 Bar/Restaurant - Non-Perimeter)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.49	-	-	-	0.84
Standard value	0.91*	N/A	N/A	N/A	0.5
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.					

1- New HWS Circuit

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.95	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.		

1- New Heating Circuit

	CHPQA quality index	CHP electrical efficiency
This building	134	0.28
Standard value	105	0.2

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			
01 Hotel Reception	-	-	-	-	1.1	-	-	-	-	-	-	N/A
01 Bar/Restaurant - Perimeter	-	-	-	-	1.1	-	-	-	-	-	-	N/A
01 Bar/Restaurant - Non-Perimeter	-	-	-	-	1.1	-	-	-	-	-	-	N/A
01 Work Zone	-	-	-	-	1.1	-	-	-	-	-	-	N/A
01 Office	-	-	-	-	1.1	-	-	-	-	-	-	N/A
01 Team Room	-	-	-	-	1.1	-	-	-	-	-	-	N/A
01 Bedroom 1	-	-	-	-	1.2	-	-	-	-	-	-	N/A

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	
01 Bedroom 2	-	-	-	-	1.2	-	-	-	-	-	N/A	
01 Bedroom 3	-	-	-	-	1.2	-	-	-	-	-	N/A	
01 Bedroom 4	-	-	-	-	1.2	-	-	-	-	-	N/A	
01 Bedroom 5	-	-	-	-	1.2	-	-	-	-	-	N/A	
01 Bedroom 6	-	-	-	-	1.2	-	-	-	-	-	N/A	
01 Bedroom 7	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 1	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 2	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 3	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 4	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 5	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 6	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 7	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 8	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 9	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 10	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 11	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 12	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 13	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 14	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 15	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 16	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 17	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 18	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 19	-	-	-	-	1.2	-	-	-	-	-	N/A	
02 Bedroom 20	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 1	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 2	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 3	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 4	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 5	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 6	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 7	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 8	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 9	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 10	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 11	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 12	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 13	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 14	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 15	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 16	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 17	-	-	-	-	1.2	-	-	-	-	-	N/A	

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	
03 Bedroom 18	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 19	-	-	-	-	1.2	-	-	-	-	-	N/A	
03 Bedroom 20	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 1	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 2	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 3	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 4	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 5	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 6	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 7	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 8	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 9	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 10	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 11	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 12	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 13	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 14	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 15	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 16	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 17	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 18	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 19	-	-	-	-	1.2	-	-	-	-	-	N/A	
04 Bedroom 20	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 1	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 2	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 3	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 4	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 5	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 6	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 7	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 8	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 9	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 10	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 11	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 12	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 13	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 14	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 15	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 16	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 17	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 18	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 19	-	-	-	-	1.2	-	-	-	-	-	N/A	
05 Bedroom 20	-	-	-	-	1.2	-	-	-	-	-	N/A	

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
06 Bedroom 1	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 2	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 3	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 4	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 5	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 6	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 7	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 8	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 9	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 10	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 11	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 12	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 13	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 14	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 15	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 16	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 17	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 18	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 19	-	-	-	-	1.2	-	-	-	-	-	N/A
06 Bedroom 20	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 1	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 2	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 3	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 4	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 5	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 6	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 7	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 8	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 9	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 10	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 11	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 12	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 13	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 14	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 15	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 16	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 17	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 18	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 19	-	-	-	-	1.2	-	-	-	-	-	N/A
07 Bedroom 20	-	-	-	-	1.2	-	-	-	-	-	N/A
08 Bedroom 1	-	-	-	-	1.2	-	-	-	-	-	N/A
08 Bedroom 2	-	-	-	-	1.2	-	-	-	-	-	N/A
08 Bedroom 3	-	-	-	-	1.2	-	-	-	-	-	N/A

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
08 Bedroom 4	-	-	-	-	-	1.2	-	-	-	-	-	N/A
08 Bedroom 5	-	-	-	-	-	1.2	-	-	-	-	-	N/A
08 Bedroom 6	-	-	-	-	-	1.2	-	-	-	-	-	N/A
08 Bedroom 7	-	-	-	-	-	1.2	-	-	-	-	-	N/A
08 Bedroom 8	-	-	-	-	-	1.2	-	-	-	-	-	N/A
08 Bedroom 9	-	-	-	-	-	1.2	-	-	-	-	-	N/A
08 Bedroom 10	-	-	-	-	-	1.2	-	-	-	-	-	N/A
08 Bedroom 11	-	-	-	-	-	1.2	-	-	-	-	-	N/A
08 Bedroom 12	-	-	-	-	-	1.2	-	-	-	-	-	N/A
08 Bedroom 13	-	-	-	-	-	1.2	-	-	-	-	-	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	
-01 Hotel Lift Lobby	-	-	63	-	67
-01 Plant Lobby	-	-	90	-	10
-01 Hotel Plant 1	-	90	-	-	189
-01 Hotel Plant 2	-	90	-	-	106
-01 Lobby 1	-	-	63	-	48
-01 Store 1	-	90	-	-	14
-01 Circulation	-	-	63	-	87
-01 Landlord's Use 1	-	90	-	-	21
-01 Landlord's Use 2	-	90	-	-	16
-01 Store 3	-	90	-	-	34
-01 Store 4	-	90	-	-	15
-01 Stair 1	-	-	79	-	41
-01 Stair 2	-	-	79	-	28
-01 Stair 3	-	-	79	-	39
-01 Store 5	-	90	-	-	26
00 Hotel Entrance Hall	-	-	63	-	79
00 Hotel Lift Lobby	-	-	63	-	161
00 Lobby 1	-	-	63	-	25
00 Comms	-	90	-	-	20
00 Archive	-	90	-	-	10
00 Linen	-	90	-	-	23
00 Bin Store	-	90	-	-	32
00 Retail Unit	-	-	60	22	517
00 Hotel Bins	-	90	-	-	30
00 Lift Pump Room	-	90	-	-	6
00 Hotel Servicing Area	-	-	90	-	46
00 Stair	-	-	79	-	54
00 Lobby 2	-	-	63	-	14
01 Hotel Reception	-	-	63	22	282

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
01 Circulation		-	63	-	77
01 Bar/Restaurant - Perimeter		-	63	22	403
01 Bar/Restaurant - Non-Perimeter		-	63	22	184
01 Work Zone		63	-	-	262
01 Luggage		60	-	-	13
01 Toilet Lobby		-	63	-	38
01 Toilets		-	63	-	115
01 BOH Circulation 1		-	90	-	124
01 Office		90	-	-	117
01 Store 1		90	-	-	5
01 Team Room		90	-	-	115
01 Cellar		90	-	-	14
01 Bottle Store		90	-	-	3
01 Wine Store		90	-	-	3
01 Staff UA/Shower		-	90	-	24
01 Lift Lobby		-	63	-	30
01 Kitchen		-	90	-	565
01 Store 2		90	-	-	20
01 BOH Circulation 2		-	90	-	40
01 Stair		-	79	-	78
01 Linen		90	-	-	7
01 Bedroom 1		-	63	-	71
01 Bedroom 2		-	63	-	77
01 Bedroom 3		-	63	-	71
01 Bedroom 4		-	63	-	69
01 Bedroom 5		-	63	-	66
01 Bedroom 6		-	63	-	69
01 Bedroom 7		-	63	-	67
01 Circulation 1		-	63	-	84
01 Circulation 6		-	63	-	7
02 Bedroom 1		-	63	-	60
02 Bedroom 2		-	63	-	63
02 Bedroom 3		-	63	-	60
02 Bedroom 4		-	63	-	79
02 Bedroom 5		-	63	-	54
02 Bedroom 6		-	63	-	55
02 Bedroom 7		-	63	-	57
02 Bedroom 8		-	63	-	59
02 Bedroom 9		-	63	-	60
02 Bedroom 10		-	63	-	61
02 Bedroom 11		-	63	-	55
02 Bedroom 12		-	63	-	55
02 Bedroom 13		-	63	-	63

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
02 Bedroom 14		-	63	-	52
02 Bedroom 15		-	63	-	56
02 Bedroom 16		-	63	-	56
02 Bedroom 17		-	63	-	63
02 Bedroom 18		-	63	-	61
02 Bedroom 19		-	63	-	61
02 Bedroom 20		-	63	-	77
02 Circulation 1		-	63	-	64
02 Circulation 2		-	63	-	42
02 Circulation 3		-	63	-	77
02 Circulation 4		-	63	-	75
02 Circulation 5		-	63	-	59
02 Circulation 6		-	63	-	72
02 Store 1		90	-	-	19
03 Bedroom 1		-	63	-	60
03 Bedroom 2		-	63	-	63
03 Bedroom 3		-	63	-	60
03 Bedroom 4		-	63	-	79
03 Bedroom 5		-	63	-	54
03 Bedroom 6		-	63	-	55
03 Bedroom 7		-	63	-	57
03 Bedroom 8		-	63	-	59
03 Bedroom 9		-	63	-	60
03 Bedroom 10		-	63	-	61
03 Bedroom 11		-	63	-	60
03 Bedroom 12		-	63	-	60
03 Bedroom 13		-	63	-	63
03 Bedroom 14		-	63	-	59
03 Bedroom 15		-	63	-	56
03 Bedroom 16		-	63	-	56
03 Bedroom 17		-	63	-	63
03 Bedroom 18		-	63	-	61
03 Bedroom 19		-	63	-	61
03 Bedroom 20		-	63	-	86
03 Circulation 1		-	63	-	64
03 Circulation 2		-	63	-	77
03 Circulation 3		-	63	-	42
03 Circulation 4		-	63	-	69
03 Circulation 5		-	63	-	65
03 Circulation 6		-	63	-	46
03 Store 1		90	-	-	22
04 Bedroom 1		-	63	-	60
04 Bedroom 2		-	63	-	63

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
04 Bedroom 3		-	63	-	60
04 Bedroom 4		-	63	-	79
04 Bedroom 5		-	63	-	54
04 Bedroom 6		-	63	-	55
04 Bedroom 7		-	63	-	57
04 Bedroom 8		-	63	-	59
04 Bedroom 9		-	63	-	60
04 Bedroom 10		-	63	-	61
04 Bedroom 11		-	63	-	60
04 Bedroom 12		-	63	-	60
04 Bedroom 13		-	63	-	63
04 Bedroom 14		-	63	-	59
04 Bedroom 15		-	63	-	56
04 Bedroom 16		-	63	-	56
04 Bedroom 17		-	63	-	63
04 Bedroom 18		-	63	-	61
04 Bedroom 19		-	63	-	61
04 Bedroom 20		-	63	-	77
04 Circulation 1		-	63	-	64
04 Circulation 2		-	63	-	77
04 Circulation 3		-	63	-	42
04 Circulation 4		-	63	-	75
04 Circulation 5		-	63	-	65
04 Circulation 6		-	63	-	46
04 Store 1		90	-	-	23
05 Bedroom 1		-	63	-	60
05 Bedroom 2		-	63	-	63
05 Bedroom 3		-	63	-	60
05 Bedroom 4		-	63	-	79
05 Bedroom 5		-	63	-	54
05 Bedroom 6		-	63	-	55
05 Bedroom 7		-	63	-	57
05 Bedroom 8		-	63	-	59
05 Bedroom 9		-	63	-	60
05 Bedroom 10		-	63	-	61
05 Bedroom 11		-	63	-	60
05 Bedroom 12		-	63	-	60
05 Bedroom 13		-	63	-	63
05 Bedroom 14		-	63	-	59
05 Bedroom 15		-	63	-	56
05 Bedroom 16		-	63	-	56
05 Bedroom 17		-	63	-	63
05 Bedroom 18		-	63	-	61

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
05 Bedroom 19		-	63	-	61
05 Bedroom 20		-	63	-	77
05 Circulation 1		-	63	-	64
05 Circulation 2		-	63	-	77
05 Circulation 3		-	63	-	42
05 Circulation 4		-	63	-	75
05 Circulation 5		-	63	-	65
05 Circulation 6		-	63	-	46
05 Store 1		90	-	-	23
06 Bedroom 1		-	63	-	60
06 Bedroom 2		-	63	-	63
06 Bedroom 3		-	63	-	60
06 Bedroom 4		-	63	-	79
06 Bedroom 5		-	63	-	54
06 Bedroom 6		-	63	-	55
06 Bedroom 7		-	63	-	57
06 Bedroom 8		-	63	-	59
06 Bedroom 9		-	63	-	60
06 Bedroom 10		-	63	-	61
06 Bedroom 11		-	63	-	60
06 Bedroom 12		-	63	-	60
06 Bedroom 13		-	63	-	63
06 Bedroom 14		-	63	-	59
06 Bedroom 15		-	63	-	56
06 Bedroom 16		-	63	-	56
06 Bedroom 17		-	63	-	63
06 Bedroom 18		-	63	-	61
06 Bedroom 19		-	63	-	61
06 Bedroom 20		-	63	-	77
06 Circulation 1		-	63	-	64
06 Circulation 2		-	63	-	77
06 Circulation 3		-	63	-	42
06 Circulation 4		-	63	-	75
06 Circulation 5		-	63	-	65
06 Circulation 6		-	63	-	46
06 Store 1		90	-	-	23
07 Bedroom 1		-	63	-	60
07 Bedroom 2		-	63	-	63
07 Bedroom 3		-	63	-	60
07 Bedroom 4		-	63	-	79
07 Bedroom 5		-	63	-	54
07 Bedroom 6		-	63	-	55
07 Bedroom 7		-	63	-	57

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
07 Bedroom 8		-	63	-	59
07 Bedroom 9		-	63	-	60
07 Bedroom 10		-	63	-	61
07 Bedroom 11		-	63	-	60
07 Bedroom 12		-	63	-	60
07 Bedroom 13		-	63	-	63
07 Bedroom 14		-	63	-	59
07 Bedroom 15		-	63	-	56
07 Bedroom 16		-	63	-	56
07 Bedroom 17		-	63	-	63
07 Bedroom 18		-	63	-	61
07 Bedroom 19		-	63	-	61
07 Bedroom 20		-	63	-	77
07 Circulation 1		-	63	-	64
07 Circulation 2		-	63	-	77
07 Circulation 3		-	63	-	42
07 Circulation 4		-	63	-	75
07 Circulation 5		-	63	-	65
07 Circulation 6		-	63	-	46
07 Store 1		90	-	-	23
08 Bedroom 1		-	63	-	61
08 Bedroom 2		-	63	-	62
08 Bedroom 3		-	63	-	63
08 Bedroom 4		-	63	-	62
08 Bedroom 5		-	63	-	62
08 Bedroom 6		-	63	-	65
08 Bedroom 7		-	63	-	61
08 Bedroom 8		-	63	-	58
08 Bedroom 9		-	63	-	58
08 Bedroom 10		-	63	-	65
08 Bedroom 11		-	63	-	63
08 Bedroom 12		-	63	-	62
08 Bedroom 13		-	63	-	65
08 Circulation 1		-	63	-	99
08 Circulation 2		-	63	-	63
08 Circulation 3		-	63	-	70
08 Circulation 4		-	63	-	48
08 Store 1		90	-	-	13
09 Plant		90	-	-	177
00 Circulation		-	63	-	64

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?
00 Comms	N/A	N/A
00 Retail Unit	NO (-28%)	NO
01 Hotel Reception	NO (-85%)	NO
01 Bar/Restaurant - Perimeter	YES (+14%)	NO
01 Bar/Restaurant - Non-Perimeter	NO (-22%)	NO
01 Work Zone	NO (-23%)	NO
01 Office	N/A	N/A
01 Team Room	N/A	N/A
01 Bedroom 1	NO (-90%)	NO
01 Bedroom 2	NO (-73%)	NO
01 Bedroom 3	NO (-68%)	NO
01 Bedroom 4	NO (-71%)	NO
01 Bedroom 5	NO (-92%)	NO
01 Bedroom 6	NO (-77%)	NO
01 Bedroom 7	NO (-92%)	NO
02 Bedroom 1	NO (-90%)	NO
02 Bedroom 2	NO (-73%)	NO
02 Bedroom 3	NO (-69%)	NO
02 Bedroom 4	NO (-81%)	NO
02 Bedroom 5	NO (-92%)	NO
02 Bedroom 6	NO (-77%)	NO
02 Bedroom 7	NO (-92%)	NO
02 Bedroom 8	NO (-79%)	NO
02 Bedroom 9	NO (-75%)	NO
02 Bedroom 10	NO (-74%)	NO
02 Bedroom 11	NO (-68%)	NO
02 Bedroom 12	NO (-68%)	NO
02 Bedroom 13	NO (-79%)	NO
02 Bedroom 14	NO (-76%)	NO
02 Bedroom 15	NO (-70%)	NO
02 Bedroom 16	NO (-70%)	NO
02 Bedroom 17	NO (-74%)	NO
02 Bedroom 18	NO (-74%)	NO
02 Bedroom 19	NO (-77%)	NO
02 Bedroom 20	NO (-73%)	NO
03 Bedroom 1	NO (-90%)	NO
03 Bedroom 2	NO (-73%)	NO
03 Bedroom 3	NO (-69%)	NO
03 Bedroom 4	NO (-81%)	NO
03 Bedroom 5	NO (-92%)	NO
03 Bedroom 6	NO (-77%)	NO
03 Bedroom 7	NO (-92%)	NO
03 Bedroom 8	NO (-79%)	NO
03 Bedroom 9	NO (-75%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
03 Bedroom 10	NO (-74%)	NO
03 Bedroom 11	NO (-72%)	NO
03 Bedroom 12	NO (-71%)	NO
03 Bedroom 13	NO (-89%)	NO
03 Bedroom 14	NO (-78%)	NO
03 Bedroom 15	NO (-70%)	NO
03 Bedroom 16	NO (-70%)	NO
03 Bedroom 17	NO (-74%)	NO
03 Bedroom 18	NO (-74%)	NO
03 Bedroom 19	NO (-77%)	NO
03 Bedroom 20	NO (-74%)	NO
04 Bedroom 1	NO (-90%)	NO
04 Bedroom 2	NO (-73%)	NO
04 Bedroom 3	NO (-69%)	NO
04 Bedroom 4	NO (-81%)	NO
04 Bedroom 5	NO (-92%)	NO
04 Bedroom 6	NO (-77%)	NO
04 Bedroom 7	NO (-92%)	NO
04 Bedroom 8	NO (-79%)	NO
04 Bedroom 9	NO (-75%)	NO
04 Bedroom 10	NO (-74%)	NO
04 Bedroom 11	NO (-71%)	NO
04 Bedroom 12	NO (-71%)	NO
04 Bedroom 13	NO (-89%)	NO
04 Bedroom 14	NO (-78%)	NO
04 Bedroom 15	NO (-70%)	NO
04 Bedroom 16	NO (-70%)	NO
04 Bedroom 17	NO (-74%)	NO
04 Bedroom 18	NO (-74%)	NO
04 Bedroom 19	NO (-77%)	NO
04 Bedroom 20	NO (-74%)	NO
05 Bedroom 1	NO (-90%)	NO
05 Bedroom 2	NO (-73%)	NO
05 Bedroom 3	NO (-69%)	NO
05 Bedroom 4	NO (-81%)	NO
05 Bedroom 5	NO (-92%)	NO
05 Bedroom 6	NO (-77%)	NO
05 Bedroom 7	NO (-92%)	NO
05 Bedroom 8	NO (-78%)	NO
05 Bedroom 9	NO (-74%)	NO
05 Bedroom 10	NO (-73%)	NO
05 Bedroom 11	NO (-71%)	NO
05 Bedroom 12	NO (-71%)	NO
05 Bedroom 13	NO (-89%)	NO
05 Bedroom 14	NO (-78%)	NO
05 Bedroom 15	NO (-70%)	NO
05 Bedroom 16	NO (-70%)	NO
05 Bedroom 17	NO (-74%)	NO
05 Bedroom 18	NO (-74%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
05 Bedroom 19	NO (-77%)	NO
05 Bedroom 20	NO (-74%)	NO
06 Bedroom 1	NO (-90%)	NO
06 Bedroom 2	NO (-73%)	NO
06 Bedroom 3	NO (-69%)	NO
06 Bedroom 4	NO (-81%)	NO
06 Bedroom 5	NO (-92%)	NO
06 Bedroom 6	NO (-77%)	NO
06 Bedroom 7	NO (-92%)	NO
06 Bedroom 8	NO (-77%)	NO
06 Bedroom 9	NO (-72%)	NO
06 Bedroom 10	NO (-72%)	NO
06 Bedroom 11	NO (-71%)	NO
06 Bedroom 12	NO (-71%)	NO
06 Bedroom 13	NO (-89%)	NO
06 Bedroom 14	NO (-78%)	NO
06 Bedroom 15	NO (-70%)	NO
06 Bedroom 16	NO (-70%)	NO
06 Bedroom 17	NO (-74%)	NO
06 Bedroom 18	NO (-73%)	NO
06 Bedroom 19	NO (-77%)	NO
06 Bedroom 20	NO (-74%)	NO
07 Bedroom 1	NO (-90%)	NO
07 Bedroom 2	NO (-73%)	NO
07 Bedroom 3	NO (-69%)	NO
07 Bedroom 4	NO (-81%)	NO
07 Bedroom 5	NO (-92%)	NO
07 Bedroom 6	NO (-77%)	NO
07 Bedroom 7	NO (-92%)	NO
07 Bedroom 8	NO (-70%)	NO
07 Bedroom 9	NO (-71%)	NO
07 Bedroom 10	NO (-72%)	NO
07 Bedroom 11	NO (-71%)	NO
07 Bedroom 12	NO (-71%)	NO
07 Bedroom 13	NO (-89%)	NO
07 Bedroom 14	NO (-78%)	NO
07 Bedroom 15	NO (-70%)	NO
07 Bedroom 16	NO (-70%)	NO
07 Bedroom 17	NO (-74%)	NO
07 Bedroom 18	NO (-73%)	NO
07 Bedroom 19	NO (-76%)	NO
07 Bedroom 20	NO (-74%)	NO
08 Bedroom 1	NO (-70%)	NO
08 Bedroom 2	NO (-71%)	NO
08 Bedroom 3	NO (-72%)	NO
08 Bedroom 4	NO (-71%)	NO
08 Bedroom 5	NO (-71%)	NO
08 Bedroom 6	NO (-89%)	NO
08 Bedroom 7	NO (-78%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
08 Bedroom 8	NO (-70%)	NO
08 Bedroom 9	NO (-70%)	NO
08 Bedroom 10	NO (-74%)	NO
08 Bedroom 11	NO (-73%)	NO
08 Bedroom 12	NO (-73%)	NO
08 Bedroom 13	NO (-89%)	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]	4859	4859
External area [m ²]	6246	6246
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	5	3
Average conductance [W/K]	2040	3767
Average U-value [W/m ² K]	0.33	0.6
Alpha value* [%]	14.42	14.42

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

Building Use

% Area	Building Type
1	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
99	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	1.35	5.49
Cooling	2.94	6.14
Auxiliary	7.53	5.62
Lighting	11.49	12
Hot water	290.16	203.08
Equipment*	22.04	22.04
TOTAL **	248.8	232.34

* 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	0.67	0
Wind turbines	0	0
CHP generators	64.67	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	71.5	134.42
Primary energy* [kWh/m ²]	225.24	335.33
Total emissions [kg/m ²]	40.6	58.7

* 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	0	1224.8	0	94.5	0	0	3.6	0	4.5	
Notional	67.5	947.5	7.7	73.1	0	2.43	3.6	----	----	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	0	0	0	0	10.7	3.59	0	4.49	0	
Notional	9.9	0	1.1	0	14	2.43	0	----	----	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	3.7	0	0.3	0	8.1	3.59	0	4.49	0	
Notional	6.8	0	0.8	0	13.4	2.43	0	----	----	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	0.1	0	0	0	33.7	3.59	0	4.49	0	
Notional	0	0	0	0	24.2	0	0	----	----	
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
Actual	17.6	414	1.5	31.9	7.5	3.36	3.6	4.2	4.5	
Notional	70.4	261.1	8.1	20.2	4.4	2.43	3.6	----	----	
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	27.6	24.9	2.1	1.4	10.1	3.59	4.86	4.49	6.08	
Notional	75	65.4	8.6	5.1	8	2.43	3.6	----	----	
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	15.7	686	1.2	39.2	11	3.59	4.86	4.49	6.08	
Notional	23.8	805.9	2.7	62.2	9.5	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 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	0.15	External Wall
Floor	0.2	0.15	Ground Floor
Roof	0.15	0.1	Roof
Windows, roof windows, and rooflights	1.5	0.9	W21 - Fixed Glazing
Personnel doors	1.5	1.03	D05 - Solid Door
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-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