JS LEWIS LTD

Thermal Comfort Assessment and Carbon Summary

Mercure Hotel, Southampton Row

Revision A

Fairview Hotels Ltd

December 2022

JS LEWIS LTD

Applicant:	Fairview Hotels Ltd
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1 INTRODUCTION

1.1 Background

Fairview Hotels Ltd is seeking planning permission for a new variable refrigerant flow Air Source Heat Pump heating and cooling system that has recently been installed. There is no development of the property proposed - only the replacement of the old cooling system with a new one that will also provide efficient, low carbon space heating. As part of the submission, the Council has asked for a thermal comfort assessment. This report considers overheating matters in relation to the scheme, policy, the context of the building use and draws a comparison between the situation prior to the installation and after it.

1.2 Description of Development

The site is the Mercure London Bloomsbury Hotel at 130-134 Southampton Row, WC1B 5AF. It is located just South East of Russell Square and comprises an 8 storey hotel building with 114 rooms. It sits within the conservation area, and is constructed of solid brick walls, and concrete floors. The windows are uPVC with openable bottom sashes. Due to the conservation considerations, there are limitations on what can and cannot be achieved.

Prior to the installation of the VRF system, the subject of this application, the servicing was as follows:

- Hot water from gas-fired water heaters;
- Space heating from pre-2006 space heating gas boilers;
- Air conditioning to each bedroom via external split units (Mitsubishi, Toshiba, Fujitsu).

The provision of cooling to bedrooms is a commercial requirement in hotels as it is an expectation of customers. As a result, all rooms have had cooling for a number of decades. The split-systems that were previously in place resulted in a battery of external split units arrayed on the internal facade wall which created a visual excrescence resulted in a poor aesthetic.

The new heat pump system (Mitsubishi PURY-M200-500) provides not only space cooling, but also space heating, thus replacing the pre-2006 space heating gas boilers. The following units have been installed:

- PURY M250 Ground Floor
- PURY M400 First Floor
- PURY M400 Second Floor
- PURY M400 Third Floor
- PURY M350 Fourth Floor
- PURY M400 Fifth Floor
- PURY M350 Sixth Floor
- PURY M300 Seventh Floor

1.3 Scope of Work

This thermal comfort assessment has been prepared to understand the performance of the building. There are no design changes proposed to the building beyond the plant replacement. Due to the transitory nature of the occupation in hotels, and the expectations of customers, hotels are generally excluded from the overheating guidance documentation.

2 METHODOLOGY

2.1 Policy Context

2.1.1 Regional Policy

The 2022 GLA Energy Guidance sets out the following notes on overheating risk assessments and the cooling hierarchy approach:

> *1. Reduce the amount of heat entering the building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure. It is also expected that external shading will form part of major proposals.*
>
> *2. Minimise internal heat generation through energy efficient design: For example, heat distribution infrastructure within buildings should be designed to minimise pipe lengths, particularly lateral pipework in corridors of apartment blocks, and adopting pipe configurations which minimise heat loss e.g. twin pipes.*
>
> *3. Manage the heat within the building through exposed internal thermal mass and high ceilings: Increasing the amount of exposed thermal mass can help to absorb excess heat within the building. Efficient thermal mass should be coupled with night time purge ventilation.*
>
> *4. Provide passive ventilation: For example, through the use of openable windows, shallow floor plates, dual aspect units or designing in the 'stack effect' where possible.*
>
> *5. Provide mechanical ventilation: Mechanical ventilation can be used to make use of 'free cooling' where the outside air temperature is below that in the building during summer months. This will require a by-pass on the heat recovery system for summer mode operation.*
>
> *6. Provide active cooling systems: The increased use of air conditioning systems is generally not supported, as these have significant energy requirements and, under conventional operation, expel hot air, thereby adding to the urban heat island effect. However, once passive measures have been prioritised if there is still a need for active cooling systems, such as air conditioning systems, these should be designed in a very efficient way and should aim to reuse the waste heat they produce.*

2.1.2 Local Policy - Overheating

Policy CC2 of the Local Plan sets out the following expectations:

> ***Policy CC2 Adapting to climate change***
> ***The Council will require development to be resilient to climate change.***
> *All development should adopt appropriate climate change adaptation measures such as:*
>
> *a. the protection of existing green spaces and promoting new appropriate green infrastructure;*
> *b. not increasing, and wherever possible reducing, surface water run- off through increasing permeable surfaces and use of Sustainable Drainage Systems;*

c. incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate; and
d. measures to reduce the impact of urban and dwelling overheating, including application of the cooling hierarchy.

Any development involving 5 or more residential units or 500 sqm or more of any additional floorspace is required to demonstrate the above in a Sustainability Statement.

Sustainable design and construction measures

The Council will promote and measure sustainable design and construction by:

e. ensuring development schemes demonstrate how adaptation measures and sustainable development principles have been incorporated into the design and proposed implementation;
f. encourage new build residential development to use the Home Quality Mark and Passivhaus design standards;
g. encouraging conversions and extensions of 500 sqm of residential floorspace or above or five or more dwellings to achieve "excellent" in BREEAM domestic refurbishment; and
h. expecting non-domestic developments of 500 sqm of floorspace or above to achieve "excellent" in BREEAM assessments and encouraging zero carbon in new development from 2019.

The Camden Planning Guidance note summarises the expectations for new developments with regard to overheating:

Efficient ventilation and cooling

3.14 Local Plan Policy CC2 discourages active cooling (air conditioning). Air conditioning will only be permitted where thermal modelling demonstrates a clear need for it after all preferred measures are incorporated in line with the London Plan cooling hierarchy (please see Chapter 10 for further information on overheating and the cooling hierarchy). The following passive measures should be considered first. If active cooling is unavoidable, applicants need to identify the cooling requirement and provide details of the efficiency of the system.

- *Water based cooling systems reduce the need for air conditioning by running cold water through pipes in the floor and/or ceiling to cool the air.*
- *Evaporation cooling could also be investigated, this cools air through the simple evaporation of water.*
- *Ground source cooling. Ground source cooling is provided by a 'ground source heat pump' in the summer the ground stays cooler than the air and the difference in temperature can be harnessed for cooling.*
- *Exposed concrete slabs can provide natural cooling. This leaves internal thermal mass (concrete slabs, stone or masonry which form part of the construction) inside a building exposed so that it can absorb excess heat in the day and slowly release it at night.*
- *Developments could adopt a natural 'stack effect' which draws cool air from lower levels whilst releasing hot air.*

Other energy efficient technology

- *High efficiency lighting with controlled sensors, e.g. timers, movement sensors and photo sensors, which adjust the brightness of the light depending on the natural light level.*

- *Zoned lighting, heating and cooling with individual control.*
- *Specifying appliances which are A+ rated.*
- *Efficient mechanical services system or a building management system – computer systems which control and monitor a building's mechanical and electrical equipment. Their main aim is to control the internal environment, but in doing so can also reduce the energy consumption of a building.*
- *Using heat recovery systems. Mechanical Ventilation with Heat Recovery (MVHR) conserves energy by recovering heat from stale warm air leaving a building and transferring the heat to the cooler incoming air.*
- *Energy monitoring, metering and controls should be used to inform and facilitate changes in user behaviour.*

Cooling hierarchy

All developments should follow the cooling hierarchy outlined below, to reduce the risk of overheating and subsequent reliance on active cooling:

1. Minimise internal heat generation through energy efficient design, considering the following:

- *Layout and uses: locate any spaces that need to be kept cool or that generate heat on cooler sides of developments.*
- *Reducing heat gains e.g. including low energy lighting.*
- *Seal/insulate heat generating processes.*
- *Reduce the distance heat needs to travel and insulate pipework.*
- *Design layouts to promote natural ventilation e.g. shallow floor plans and high floor to ceiling heights.*
- *Consider evaporation cooling which cools air through the evaporation of water.*
- *Consider 'free cooling' or 'night cooling', which uses the cooling capacity of ambient air to directly cool the space.*

2. Reduce the amount of heat entering a building in summer:

- *Consider the angle of the sun and optimum daylight and solar gain balance.*
- *Orientate and recess windows and openings to avoid excessive solar gain.*
- *Consider low g-values and the proportion, size and location of windows.*
- *Make use of shadowing from other buildings.*
- *Include adequate insulation.*
- *Design in shading: e.g. include internal courtyards, large shade-providing trees and vegetation, balconies, louvers, internal or external blinds, and shutters.*
- *Make use of the albedo effect (use light coloured or reflective materials to reflect the sun's rays).*
- *Include green infrastructure e.g. green wall, green/blue roofs and landscaping, to regulate temperatures.*
- *Reduce the amount of heat entering a building in summer.*

3. Manage the heat within the building through exposed internal thermal mass and high ceilings, (see 'Thermal performance' Chapter 3 of this CPG).

4. Passive ventilation:

- *Natural ventilation, openable windows, the 'stack effect' system (see Chapter 3 of this guidance).*
- *Design layouts to promote natural ventilation e.g. shallow floor plans and high floor to ceiling heights.*

• Consider evaporation cooling which cools air through the evaporation of water.
• Consider 'free cooling' or 'night cooling' which uses the cooling capacity of ambient air to directly cool the space

5. Mechanical ventilation:
• Ensuring the most efficient system possible.
• Consider mechanical ventilation with heat recovery

6. Active cooling:
• Ensuring they are the lowest carbon options.
• Ground Source Heat Pumps and Air Source Heat Pumps can be used in reverse to provide cooling to buildings.
• Water based cooling systems also reduce the need for air conditioning by running cold water through pipes in the floor and/or ceiling to cool the air.

2.1.3 Local Policy - Energy, Carbon and Sustainability

The Guidance note also covers the following points:

- The reuse of existing buildings is the most sustainable form of development;
- Opportunities to improve the carbon performance of the existing stock should be taken;
- The implications of conservation areas should be taken into account where applicable.

2.2 Overheating in Hotels

Hotels are residential in their nature, although occupancy can be substantially lower due to voids, and it is also not typically an all day occupancy as one might expect in a residential dwelling. Both CIBSE TM52 and TM59 avoid mention of hotels.

The appropriate methodology to follow for the overheating risk assessment in bedrooms is deemed to be CIBSE TM59 (2017) – Design methodology for the assessment of overheating risk in homes. It is described by its authors as a technical memorandum, and has been written to standardize the approach to risk assessments. It has specifically been written to provide guidance to new build developments and their design.

It sets out design comfort criteria derived from CIBSE TM52 and CIBSE Guide A, an assessment methodology and suggested reporting requirements. Key aspects include:

- Modeling should be based on a suitable sample of units;
- The building should be zoned and modeled using likely materials and build-ups;
- Standard profiles should be applied for occupancy, lighting and equipment gains;
- Operable windows should be included in the design;
- Internal and external shading should be included (but note that Part O and the GLA guidance does not permit the modelling of internal blinds);
- Any mechanical ventilation should be included;
- Weather should be local Design Summer Year for the most appropriate location for 2020 high emissions 50% scenario;
- Modeling should use hourly dynamic simulation modeling.

The suggested reporting requirements include:

- Dynamic analysis software used;

- Site location and orientation;
- Images of the model and units for testing;
- Information on constructions used including thermal mass;
- Ventilation strategy modeled including details of openings and ventilation rates;
- Weather files used;
- Category of building;
- Reports of the analysis;
- Statement of whether it passes or fails.

2.3 Criteria for Naturally Ventilated Rooms

For naturally ventilated rooms, the compliance criteria are as follows:

1. For living rooms, kitchens and bedrooms: the number of hours during which dT is greater than or equal to one degree (K) during the period of May to September inclusive shall not be more than 3% of occupied hours (CIBSE TM52 criterion 1: hours of exceedance);
2. For bedrooms only: to guarantee comfort during the sleeping hours the operative temperature in the bedroom from 10pm to 7am shall not exceed 26ºC for more than 1% of annual hours.

Criteria 2 and 3 from TM52 may fail to be met, but both of the above must be passed for relevant rooms.

2.4 Criteria for Mechanically Ventilated Rooms

For rooms with restricted openings the CIBSE fixed temperature test must be followed, i.e. all occupied rooms should not exceed an operative temperature of 26ºC for more than 3% of annual occupied hours (CIBSE Guide A 2015).

3 THERMAL MODEL INPUTS

3.1 Software

This assessment uses EDSL Tas which is a dynamic modeling package that has an in-built TM59 wizard that sets up the requisite parameters for reporting. EDSL Tas is a recognised and accepted dynamic thermal modelling package for undertaking overheating assessments.

3.2 Weather Files

The weather files used for testing the scheme were London Heathrow weather files for the DSY1 2020 High 50 scenario, for which a pass would be expected for standard residential development under TM59. Other scenarios tested were DSY 2 and 3 representing different extreme weather scenarios. Where the tests are not met, a requirement for active cooling is identified.

3.3 The Rooms for Testing

The sixth floor was modelled. The units were selected as they represent a variety of units types and orientations that are extant in the proposed development.

3.4 3D Model

A 3D model was built for a typical floor plate. In this development, An image of the model developed is set out below:

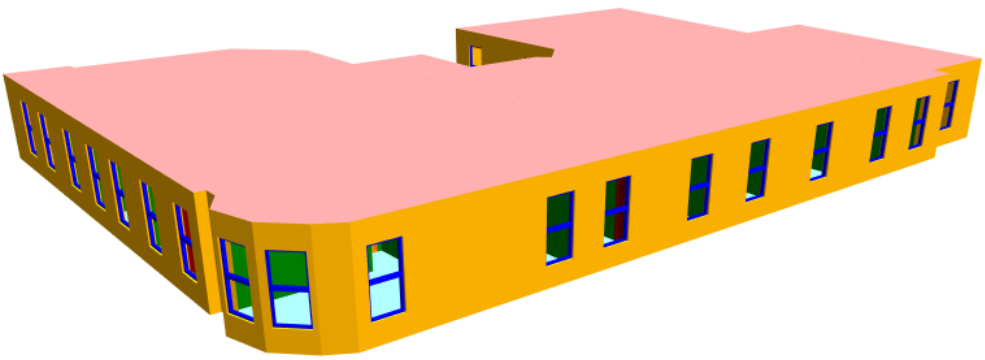

Figure 1 - 3D Model View

3.5 Modelling Inputs

3.5.1 Drawings Used

The tests were based upon the drawings submitted as part of the application:

- Site Plan;

- Floor Plans;
- Elevations.

3.5.2 Constructions

The construction types used in the model are as follows:

- Internal floor – floor finish on concrete frame;
- Internal wall – plaster skim on single brick wall;
- External wall - 345mm solid brick wall with plaster skim;
- Windows – double-glazed uPVC windows with openable bottom sash.

3.5.3 Ventilation

Natural purge ventilation approaches should normally be used in preference to mechanical purge ventilation wherever possible, and the ability to open windows is an important factor in allowing occupants control of their environment. Background infiltration is set at 0.15. The options for different ventilation needs are therefore as follows:

- Background ventilation:
    - Trickle ventilation.
- Purge ventilation:
    - Openable windows;
    - Mechanical ventilation with local boost function.
- Overheating control:
    - Openable windows;
    - Mechanical ventilation;
    - Mechanical cooling (non-ventilating, but often required where mechanical ventilation cannot meet the overheating temperature reductions).

In this case, it is assumed that natural ventilation is achieved via openable windows. Intermittent extract fans are used in the bathrooms.

4 COOLING HIERARCHY RESPONSE AND RESULTS

4.1 Cooling Hierarchy Response

The proposals are for the replacement of an old air conditioning system with a new one that can also provide low carbon space heating. There is no extension, or architectural alternation proposed, and the scheme is highly constrained within its own site and within the wider conservation area designation. Nevertheless, the cooling hierarchy, designed principally with new build schemes in mind, is addressed below for completeness:

- Reduce the amount of heat entering the building:
  - Many windows achieve natural shading from the building itself, from orientation, and from the window design with deep reveals;
  - Windows design and glazed areas are modest in comparison with new-build developments.
- Minimise internal heat gain:
  - Low energy lighting employed;
  - Communal space heating pipe work has been decommissioned to make way for the VRF system, reducing internal gains substantially.
- Manage heat within the building:
  - Extensive exposed thermal mass through solid brick walls and concrete floors;
- Passive ventilation:
  - Openable windows are provided;
- Mechanical ventilation:
  - This is not used beyond the intermittent extract fans are required by Building Regulations for the bathrooms.
- Active cooling
  - This has been the provision for decades in all rooms, a requirement that is market driven in the hotel sector;
  - The replacement system provides not just cooling but also very efficient low carbon space heating, replacing the old fossil fuel system.

4.2 Results - DSY 1 2020 High 50

DSY 1 - represents warmer than typical year and is used to evaluate overheating risk within buildings. DSY 1 represents a moderately warm summer year, defined as a year with a SWCDH return period closest to 7 years.

The modelled rooms mostly pass the criteria, demonstrating that the cooling load will be small. It is not unusual for individual rooms to fail the criteria with the London Heathrow temperature dataset. The results are set out in the appendices.

4.3 Results - DSY2 and DSY 3

DSY 2 – represents an intense extreme year, which is chosen as the year with the event which is about the same length as the moderate summer year but has a higher intensity than the moderate summer.

DSY 3 – represents a long extreme year is determined by the year with a less intense extreme than the high intensity year, more intense extreme than the moderate summer year but also has a longer duration than the moderate summer year.

The scheme again largely meets the test criteria when windows are openable.

4.4 Carbon Emissions

The new cooling system replaces the old fossil-fuel space heating system. This in itself is a benefit, but also provides a carbon benefit. This has been estimated as follows:

Old Plant	MWh/annum	tCO2/annum
Electricity	480	65
Gas - SH	285	73
Gas - DHW	540	129
Gas - Total	825	202
Totals	1,305	267

Revised Plant	MWh/annum	tCO2/annum
Electricity (Ancillary)	480	
Elec - SH	83	
Total Elec	563	77
Gas DHW	540	129
Totals	1,103	206

	tCO2/annum
Estimated Carbon Saving	62

The revised plant could save an estimated 62tCO2 per annum.

4.5 Proposed Approach

Openable windows provide a substantial quantity of air movement, and associated cooling effect. As a result, the general level of performance is strong, particularly noting that the assessment is of an existing building in a conservation area. There are some rooms that marginally fail the test criteria.

Active cooling as a solution to overheating is acceptable where the cooling hierarchy has been addressed by the scheme.

Furthermore, the hotel sector is an unusual one from an overheating perspective as air conditioning tends to be provided as a matter of course. Non-provision would result in a less competitive market offering and potentially a less viable business.

In this case, cooling was already in place. The new system helps remove fossil fuel use from the site by replacing the space heating system, as well as updating the cooling system. As a result, its introduction is a positive move.

5 CONCLUSION

5.1 Proposals

Fairview Hotels Ltd is seeking planning permission for a new variable refrigerant flow Air Source Heat Pump heating and cooling system that has recently been installed. There is no development of the property proposed - only the replacement of the old cooling system with a new one that will also provide efficient, low carbon space heating. As part of the submission, the Council has asked for an overheating assessment. This report considers thermal comfort and overheating matters in relation to the scheme, policy, the context of the building use and draws a comparison between the situation prior to the installation and after it.

5.2 Thermal Comfort Assessment Results

The scheme performs well under the overheating assessment methodology, despite being a special case (a hotel), and being heavily constrained as an existing building within a conservation area. A small cooling load is estimated by the modelling. The cooling hierarchy has been addressed:

- Reduce the amount of heat entering the building:
    - Many windows achieve natural shading from the building itself, and from the window design with deep reveals;
    - Windows design and glazed areas are modest in comparison with new-build developments.
- Minimise internal heat gain:
    - Low energy lighting employed throughout;
    - Communal space heating pipe work has been decommissioned to make way for the VRF system, reducing internal gains substantially.
- Manage heat within the building:
    - Extensive exposed thermal mass through solid brick walls and concrete floors;
- Passive ventilation:
    - Openable windows are provided;
- Mechanical ventilation:
    - This is not used beyond the intermittent extract fans are required by Building Regulations for the bathrooms.
- Active cooling
    - This has been the provision for decades in all rooms, a requirement that is market driven in the hotel sector;
    - The replacement system provides not just cooling but also very efficient low carbon space heating, replacing the old fossil fuel system.

Under the DSY1 2020High50 scenario when naturally ventilated via openable windows, the bedrooms largely meet the expectations of TM59. This also applies to DSY2 and DSY3.

5.3 Carbon Emissions

The new system is estimated to achieve carbon savings of 62tCO2 per annum.

5.4 Compliance

The scheme has had its overheating risks assessed, has addressed the cooling hierarchy, and has also assessed the potential carbon benefits of the new cooling and heating plant. The scheme can therefore be considered as compliant in planning policy terms.

APPENDIX

DSY1 LHR 2020High50 Results (windows open)

DSY2 LHR (windows open)

DSY3 LHR (windows open)

Domestic Overheating (CIBSE TM59)

Project Details

Building Designer File (.tbd): P527 Mercure_London_LHR_DSY1_2020High50.tbd

Simulation Results File (.tsd): P527 Mercure_London_LHR_DSY1_2020High50.tsd

Date: 19 December 2022

Building Category: Category II

Natural Ventilation Overheating Results

Zone Name	Room Use	Wind Speed (m/s)	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Annual Night Occupied Hours for Bedroom	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms .	Result
601	Bedroom	0.1	3672	110	0	3285	32	13	Pass
602	Bedroom	0.1	3672	110	0	3285	32	25	Pass
603	Bedroom	0.1	3672	110	0	3285	32	19	Pass
604	Bedroom	0.1	3672	110	0	3285	32	15	Pass
605	Bedroom	0.1	3672	110	0	3285	32	15	Pass
606	Bedroom	0.1	3672	110	0	3285	32	8	Pass
607	Bedroom	0.1	3672	110	0	3285	32	30	Pass
608	Bedroom	0.1	3672	110	0	3285	32	60	Fail
609	Bedroom	0.1	3672	110	0	3285	32	59	Fail
610	Bedroom	0.1	3672	110	0	3285	32	37	Fail
611	Bedroom	0.1	3672	110	0	3285	32	44	Fail
612	Bedroom	0.1	3672	110	0	3285	32	8	Pass
613	Bedroom	0.1	3672	110	0	3285	32	60	Fail
614	Bedroom	0.1	3672	110	0	3285	32	5	Pass
615	Bedroom	0.1	3672	110	0	3285	32	11	Pass
616	Bedroom	0.1	3672	110	0	3285	32	0	Pass
617	Bedroom	0.1	3672	110	0	3285	32	8	Pass
618	Bedroom	0.1	3672	110	0	3285	32	2	Pass

*Zone names that have an orange coloured font are bedrooms which do not have 24/7 365 days a year occupancy, as per the TM59 guidance.

Domestic Overheating (CIBSE TM59)

Project Details

Building Designer File (.tbd): P527 Mercure_London_LHR_DSY2.tbd

Simulation Results File (.tsd): P527 Mercure_London_LHR_DSY2.tsd

Date: 19 December 2022

Building Category: Category II

Natural Ventilation Overheating Results

Zone Name	Room Use	Wind Speed (m/s)	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Annual Night Occupied Hours for Bedroom	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms .	Result
601	Bedroom	0.1	3672	110	0	3285	32	14	Pass
602	Bedroom	0.1	3672	110	0	3285	32	24	Pass
603	Bedroom	0.1	3672	110	0	3285	32	17	Pass
604	Bedroom	0.1	3672	110	0	3285	32	14	Pass
605	Bedroom	0.1	3672	110	0	3285	32	14	Pass
606	Bedroom	0.1	3672	110	0	3285	32	6	Pass
607	Bedroom	0.1	3672	110	0	3285	32	35	Fail
608	Bedroom	0.1	3672	110	0	3285	32	61	Fail
609	Bedroom	0.1	3672	110	0	3285	32	59	Fail
610	Bedroom	0.1	3672	110	0	3285	32	41	Fail
611	Bedroom	0.1	3672	110	0	3285	32	47	Fail
612	Bedroom	0.1	3672	110	0	3285	32	10	Pass
613	Bedroom	0.1	3672	110	0	3285	32	63	Fail
614	Bedroom	0.1	3672	110	0	3285	32	3	Pass
615	Bedroom	0.1	3672	110	0	3285	32	11	Pass
616	Bedroom	0.1	3672	110	0	3285	32	0	Pass
617	Bedroom	0.1	3672	110	0	3285	32	10	Pass
618	Bedroom	0.1	3672	110	0	3285	32	0	Pass

*Zone names that have an orange coloured font are bedrooms which do not have 24/7 365 days a year occupancy, as per the TM59 guidance.

Domestic Overheating (CIBSE TM59)

Project Details

Building Designer File (.tbd): P527 Mercure_London_LHR_DSY3.tbd
Simulation Results File (.tsd): P527 Mercure_London_LHR_DSY3.tsd
Date: 19 December 2022
Building Category: Category II

Natural Ventilation Overheating Results

Zone Name	Room Use	Wind Speed (m/s)	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Annual Night Occupied Hours for Bedroom	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms .	Result
601	Bedroom	0.1	3672	110	0	3285	32	2	Pass
602	Bedroom	0.1	3672	110	0	3285	32	6	Pass
603	Bedroom	0.1	3672	110	0	3285	32	20	Pass
604	Bedroom	0.1	3672	110	0	3285	32	20	Pass
605	Bedroom	0.1	3672	110	0	3285	32	7	Pass
606	Bedroom	0.1	3672	110	0	3285	32	12	Pass
607	Bedroom	0.1	3672	110	0	3285	32	19	Pass
608	Bedroom	0.1	3672	110	0	3285	32	67	Fail
609	Bedroom	0.1	3672	110	0	3285	32	57	Fail
610	Bedroom	0.1	3672	110	0	3285	32	22	Pass
611	Bedroom	0.1	3672	110	0	3285	32	31	Pass
612	Bedroom	0.1	3672	110	0	3285	32	6	Pass
613	Bedroom	0.1	3672	110	0	3285	32	56	Fail
614	Bedroom	0.1	3672	110	0	3285	32	6	Pass
615	Bedroom	0.1	3672	110	0	3285	32	2	Pass
616	Bedroom	0.1	3672	110	0	3285	32	0	Pass
617	Bedroom	0.1	3672	110	0	3285	32	2	Pass
618	Bedroom	0.1	3672	110	0	3285	32	0	Pass

*Zone names that have an orange coloured font are bedrooms which do not have 24/7 365 days a year occupancy, as per the TM59 guidance.

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