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C O N S U L T I N G

OVERHEATING STATEMENT

PROPOSED CARE HOME on

FORMER BULL & MONKIE PUBLIC HOUSE

CHURCHGATE, SPALDING, PE11 2RA

For

CRISPEN HOLDINGS LTD

DOC No: 2109-REP-OH-01

REVISION P1
JANUARY 2023

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2109-REP-OH-01



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Revision	Date Issued	Description	Prepared	Approved
P1	16.01.2023	First Issue	TS	MC

1 Overheating

Building Regulations Part O:2021 focuses on the internal comfort levels within residential buildings which includes dwellings, hall of residence, student accommodation and residential institutions for older and disabled people. As such the proposed 88 bed Class C2 (Residential Institutions: Hospitals and Care Homes) care home at the former Drum and Monkie, Churchgate, Spalding, PE11 2RA falls under Part O:2021 regulations.

To demonstrate compliance with Part O:2021 either a simplified or dynamic overheating analysis needs to be undertaken.

Simplified Method

For buildings without cross ventilation and in a 'moderate risk' location (England, excluding high risk parts of London) solar gains shall be limited via the glazing area in accordance with the following:

Largest glazed façade orientation	Moderate risk location	
	Maximum area of glazing (% floor area)	Maximum area of glazing in the most glazed room (% floor area of room)
North	15%	26%
East	18%	26%
South	15%	15%
West	18%	11%

Excess heat shall be removed via natural ventilation and opening area due in line with the following where there is no cross ventilation.

	Moderate risk location
Total minimum free area	The greater of the following: a. 12% of floor area b. 80% of the glazing area
Bedroom minimum free area	4% of the floor area of the room

To enhance the resident's wellbeing within the proposed care home, the glazing areas exceed those above in order to provide natural light and views of the gardens and grounds, especially for bed bound residents or those with limited mobility. In addition to this, the enhanced levels of natural light limits the amount of artificial light needed to provide suitable light levels, reducing the building energy usage and emissions. Similarly, to protect resident safety, window openings shall be limited to 100mm, restricting the opening area that can be achieved to below 4% of the bedroom floor area. Should this be increased to 4%, window sizes would be larger, further exceeding the glazing to floor area ratio outlined under the simplified method.

As such, to comply with Part O:2021 without reducing the window size a dynamic thermal model will need to be undertaken in line with the following.

Dynamic Thermal Modelling

To demonstrate compliance using the dynamic thermal modelling method, all of the following guidance should be followed.

- a. CIBSE's TM59 methodology for predicting overheating risk
- b. The limits on the use of CIBSE's TM59 methodology
 - When a room is occupied during the day (8am to 11pm), openings should be modelled to do all of the following.
 - a. Start to open when the internal temperature exceeds 22°C
 - b. Be fully open when the internal temperature exceeds 26°C
 - c. Start to close when the internal temperature falls below 26°C
 - d. Be fully closed when the internal temperature falls below 22°C
- c. The acceptable strategies for reducing overheating risk
 - Solar gains in summer should be limited by any of the following means.
 - a. Fixed shading devices, comprising any of the following
 - i. Shutters; ii. External blinds; iii. Overhangs; iv. Awnings
 - b. Glazing design, involving any of the following solutions
 - i. Size; ii. Orientation; iii. G-value; iv. Depth of window reveal
 - c. Building design – for example, the placement of balconies
 - d. Shading provided by adjacent permanent builds, structures, or landscaping
 - Although internal blinds and curtains provide some reduction in solar gains, they should not be taken into account when considering whether requirement O1 has been met
 - Foliage, such as tree cover, can provide some reduction in solar gains. However, it should not be taken into account when considering whether requirement O1 has been met.
 - Excess heat should be removed from the residential building by any of the following means
 - a. Opening windows; b. Ventilation louvres in external walls; c. A mechanical ventilation system; d. A mechanical cooling system.
 - The building should be constructed to meet requirement O1 using passive means as far as reasonably practicable. Any mechanical cooling (air-conditioning) is expected to be used only where requirement O1 cannot be met using openings.

1.1 Overheating Assessment/Criteria

A full building dynamic thermal model following the acceptable strategies to reduce the overheating risk outlined above shall be undertaken by the contractor during the detailed design period.

All spaces other than bedrooms shall be assessed by the contractor in accordance with the criteria set out in CIBSE TM52 as follows:

The first criterion sets a limit for the number of hours that the operative temperature can exceed the threshold comfort temperature (upper limit of the range of comfort temperature) by 1K or more during the occupied hours of a typical non-heating season (1 May to 30 September).

The second criteria deals with the severity of overheating within any one day, which can be as

important as its frequency, the level of which is a function of both temperature rise and its duration. This criterion sets a daily limit for acceptability. The third criterion sets an absolute maximum daily temperature for a room, beyond which the level of overheating is unacceptable.

Bedrooms shall be assessed in accordance with criteria set out in TM59 as follows:

The first criterion is to guarantee comfort during the sleeping hours the operative temperature in the bedroom from 10pm to 7am shall not exceed 26°C for more than 1% of annual hours. *(Note: 1% of the annual hours between 22:00 and 07:00 for bedrooms is 32 hours, so 33 or more hours above 26°C will be recorded as a fail).*

The second criteria is the same as that of criteria 1 in TM52 where a limit for the number of hours that the operative temperature can exceed the threshold comfort temperature (upper limit of the range of comfort temperature) by 1K or more during the occupied hours of a typical non-heating season (1 May to 30 September).

1.2 Measures to mitigate overheating

In line with the client specification the service to each room type shall generally be as follows.

Room Type	Ventilation	Cooling
Bedroom	Natural	Natural (openable windows)
Dayspace	Mechanical heat recovery	Mechanical cooling via ceiling cassettes where required by room heat gain
Office	Natural where possible. Mechanical ventilation where space is landlocked	Natural (openable windows) where possible. No comfort cooling to be provided where landlocked.

Where the above baseline specification fails to meet the criteria set out in either CIBSE TM52 or TM59 the following measures shall be incorporated, as appropriate, to limit overheating. The extent of these measures (for example the air change rates and/or g-value required to mitigate overheating in each room) shall be determined by the contractor during the detailed design phase. Following the industry recognised energy hierarchy passive measures shall be fully exhausted prior to the incorporation of mechanical solutions.

Room Type	Passive Measures	Mechanical Measures
Dayspace/ Office	Improvement of glazing g-value and light transmission to limit solar gains	- Increase of MVHR supply and extract, or installation where natural ventilation proposed. - Installation of mechanical comfort cooling
Bedroom	Improvement of glazing g-value and light transmission to limit solar gains	- Installation of boost button to en-suite extract ventilation to boost the overall air changes that can be achieved through free cooling - Installation of local MVHR to supply and extract air to bedroom and en-suite, respectively - Installation of mechanical comfort cooling

Through the incorporation of technologies following the above hierarchy during the detailed design phase, all criterion set out in CIBSE TM52 and TM59 shall be passed and demonstrated through dynamic simulation to outline compliance with Part O:2021.