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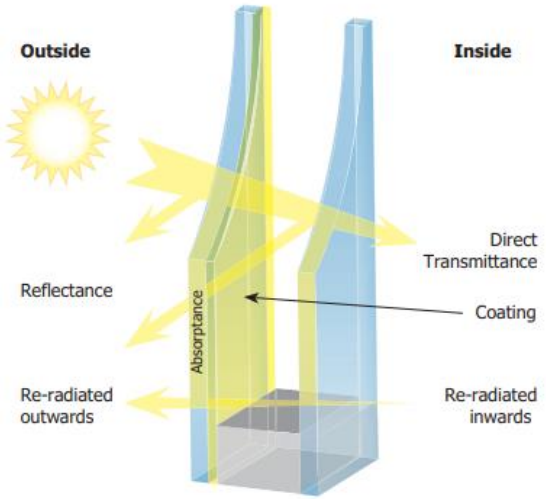
Approved Document O Overheating 2021 (England)

Detailed version

Transitional arrangements

This approved document takes effect on 15 June 2022 for use in England. It does not apply to work subject to a building notice, full plans application or initial notice submitted before that date, provided the work is started on site before 15 June 2023.

Overheating



ONLINE VERSION

HM Government

The Building Regulations 2010

Overheating

APPROVED DOCUMENT

Requirement O1: Overheating mitigation

Regulations: 40B

2021 edition – for use in England

ONLINE VERSION

Scope

- New residential buildings only
- Applies to parts of mixed-use buildings that are for residential purposes only

Table 0.1 Residential buildings within the scope of this approved document

Title	Purpose for which the building is intended to be used
Residential (dwellings)	Dwellings, which includes both dwellinghouses and flats.
Residential (institutional)	Home, school or other similar establishment, where people sleep on the premises. The building may be living accommodation for the care or maintenance of any of the following. a. Older and disabled people, due to illness or other physical or mental condition. b. People under the age of 5 years.
Residential (other)	Residential college, hall of residence and other student accommodation, and living accommodation for children aged 5 years and older.

Requirement O1 of Building Regulations

(1) Reasonable provision must be made in respect of a dwelling, institution or any other building containing one or more rooms for residential purposes, other than a room in a hotel ("residences") to—

(a) limit unwanted solar gains in summer;

(b) provide an adequate means to remove heat from the indoor environment.

(2) In meeting the obligations in paragraph (1)—

(a) account must be taken of the safety of any occupant, and their reasonable enjoyment of the residence; and

(b) mechanical cooling may only be used where insufficient heat is capable of being removed from the indoor environment without it.

Intention

- *To protect health and welfare of occupants by reducing occurrence of high indoor temperatures*
- Both of the following should be achieved:
  - Limit unwanted solar gains in summer
  - Provide adequate means of removing excess heat from indoor environment
- Two methods for demonstrating compliance:
  - Simplified method
  - Dynamic thermal modelling method
- Two risk categories for simplified method:
  - 'Moderate risk' location (England, excluding higher risk parts of London)
  - 'High risk' location (urban and some suburban parts of London)
  - Some parts of central Manchester fall in 'high risk' category

Simplified method

Limiting solar gains – (1)

- Buildings or parts of buildings with cross-ventilation
- *(Cross ventilation – openings on opposite elevations)*

Table 1.1 Limiting solar gains for buildings or parts of buildings with cross-ventilation[1]

	High risk location		Moderate risk location	
Largest glazed façade orientation	Maximum area of glazing (% floor area)	Maximum area of glazing in the most glazed room (% floor area of room)	Maximum area of glazing (% floor area)	Maximum area of glazing in the most glazed room (% floor area of room)
North	15	37	18	37
East	18	37	18	37
South	15	22	15	30
West	18	37	11	22

Limiting solar gains – (2)

- Buildings or parts of buildings without cross-ventilation

Table 1.2 Limiting solar gains for buildings or parts of buildings without cross-ventilation[1]

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

Acceptable shading solutions

- For residential buildings in ‘high risk’ locations, maximum glazed areas should not be exceeded (see previous two slides)
- Additionally, shading should be provided for glazed areas between compass points NE and NW via South
- Shading should be one of the following means:
  - External shutters (with ventilation)
  - Glazing with maximum g value of 0.40 and minimum light transmittance of 0.70
  - Overhangs with 50^{o} altitude cut-off on due South-facing facades only

Removing excess heat

- *('Free area' – geometric open area of ventilation opening)*

Table 1.3 Minimum free areas for buildings or parts of buildings with cross-ventilation

	High risk location	Moderate risk location
Total minimum free area[1]	The greater of the following: a. 6% of the floor area[2] b. 70% of the glazing area[3]	The greater of the following: a. 9% of the floor area[2] b. 55% of the glazing area[3]
Bedroom minimum free area	13% of the floor area of the room[4]	4% of the floor area of the room[4]

Table 1.4 Minimum free areas for buildings or parts of buildings without cross-ventilation

	High risk location	Moderate risk location
Total minimum free area[1]	The greater of the following: a. 10% of the floor area[2] b. 95% of the glazing area[3]	The greater of the following: a. 12% of the floor area[2] b. 80% of the glazing area[3]
Bedroom minimum free area	13% of the floor area of the room[4]	4% of the floor area of the room[4]

High risk areas (by postcode)

- Central Manchester: M1 M2 M3 M5 M15 M16 M50
- London:

CR4	E17	EC3R	KT6	N22	SE8	SE27	SW11	TW10	W1F	W12
CR7	E18	EC3V	KT7	NW1	SE9	SE28	SW12	TW11	W1G	W13
E1	E20	EC4A	KT8	NW2	SE10	SW1A	SW13	TW12	W1H	W14
E1W	EC1A	EC4M	IG11	NW3	SE11	SW1E	SW14	TW13	W1J	WC1A
E2	EC1M	EC4N	N1	NW5	SE12	SW1H	SW15	TW14	W1K	WC1B
E3	EC1N	EC4R	N1C	NW6	SE13	SW1P	SW16	TW15	W1S	WC1E
E4	EC1R	EC4V	N2	NW8	SE14	SW1V	SW17	TW19	W1T	WC1H
E5	EC1V	EC4Y	N4	NW10	SE15	SW1W	SW18	UB1	W1U	WC1N
E6	EC1Y	HA0	N5	NW11	SE16	SW1X	SW19	UB2	W1W	WC1R
E7	EC2A	HA9	N6	RM8	SE17	SW1Y	SW20	UB3	W2	WC1V
E8	EC2M	IG1	N7	RM9	SE18	SW2	TW1	UB4	W3	WC1X
E9	EC2N	IG2	N8	RM10	SE19	SW3	TW2	UB5	W4	WC2A
E10	EC2P	IG3	N9	SE1	SE20	SW4	TW3	UB6	W5	WC2B
E11	EC2R	IG4	N13	SE2	SE21	SW5	TW4	UB7	W6	WC2E
E12	EC2V	KT1	N15	SE3	SE22	SW6	TW5	UB8	W7	WC2H
E13	EC2Y	KT2	N16	SE4	SE23	SW7	TW6	UB11	W8	WC2N
E14	EC3A	KT3	N17	SE5	SE24	SW8	TW7	W1B	W9	WC2R
E15	EC3M	KT4	N18	SE6	SE25	SW9	TW8	W1C	W10	
E16	EC3N	KT5	N19	SE7	SE26	SW10	TW9	W1D	W11	

Dynamic thermal modelling method

Limiting solar gains

- Use of thermal modelling to demonstrate risk of overheating is mitigated (e.g. CIBSE TM59 (1))
- Takes into account parameters such as:
  - Shading (e.g. shutters, external blinds, overhangs, etc.)
  - Glazing (e.g. size, orientation, g value, etc.)
  - Building design

- (1) Chartered Institution of Building Services Engineers (CIBSE) TM59 *Design methodology for the assessment of overheating risk in homes*

Other considerations

- Any solution for mitigating overheating in new residential buildings also needs to consider impact on:
- Noise at night (effect on ventilation if windows closed at night)
- Pollution (minimise intake of external internal pollutants)
- Security (may not be practical to open easily accessible windows)
- Protection from falling (consider risk of occupants falling from height)
- Protection from entrapment (consideration for louvred shutters)

Conclusions

- Simplified method focused on 'high risk' areas – London and central Manchester
- All other areas of England considered 'moderate risk' – no shading needed, but restricted on maximum glazed areas
- If maximum glazed areas exceeded, even for moderate risk areas, then detailed method undertaken
  - Shading measures (including glazing g value) taken into account in modelling
- Housebuilders and developers may need to decide – reduce glazed areas or introduce shading solution?
- One of acceptable shading solutions is glazing with 70/40 performance (e.g. Pilkington **Suncool™** 70/35)

Part L hub

- Developed and kept updated with latest info
- Includes section on overheating regulations
- Short URL: http://www.pilkington.co.uk/partl2021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