Watkins Payne

BUILDING REGULATIONS

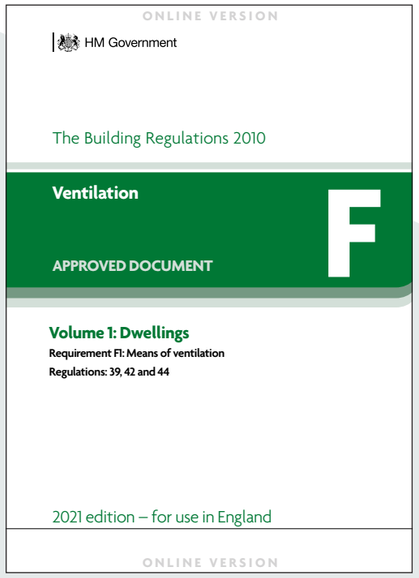
Updates to Part F, Part L and the newly introduced Part O

2021 EDITION

15TH JUNE 2022

This marks the implementation of the following documents

PART F
Ventilation


ONLINE VERSION

HM Government

The Building Regulations 2010

Ventilation

APPROVED DOCUMENT

F

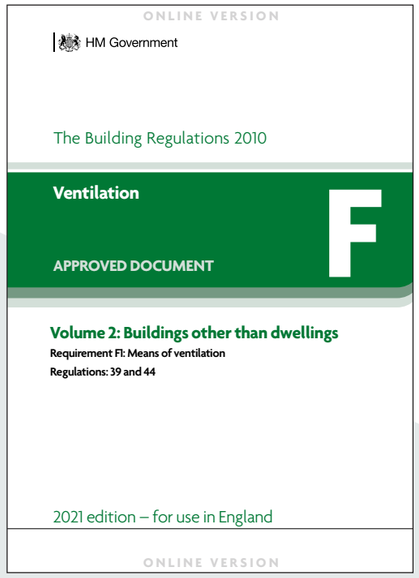
Volume 1: Dwellings

Requirement F1: Means of ventilation

Regulations: 39, 42 and 44

2021 edition – for use in England

ONLINE VERSION


ONLINE VERSION

HM Government

The Building Regulations 2010

Ventilation

APPROVED DOCUMENT

F

Volume 2: Buildings other than dwellings

Requirement F1: Means of ventilation

Regulations: 39 and 44

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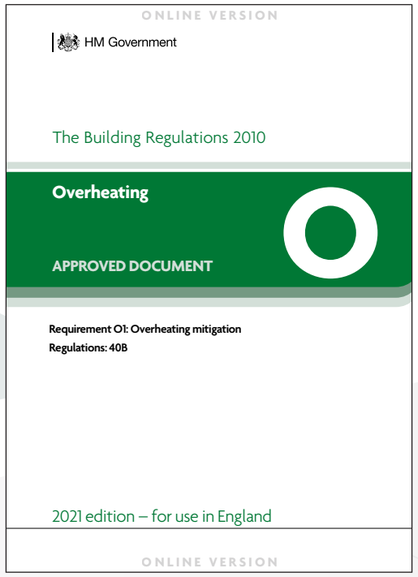
PART O
Overheating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HM Government

The Building Regulations 2010

Overheating

APPROVED DOCUMENT

O

Requirement O1: Overheating mitigation

Regulations: 40B

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ONLINE VERSION

PART L
Conservation of fuel and Power

ONLINE VERSION

HM Government

The Building Regulations 2010

Conservation of fuel and power

APPROVED DOCUMENT

L

Volume 1: Dwellings

Requirement L1: Conservation of fuel and power

Requirement L2: Onsite generation of electricity

Regulations: 6, 22, 23, 24, 25, 25A, 25B, 26, 26A, 26C, 27, 27A, 27C, 28, 40, 40A, 43, 44 and 44ZA

2021 edition – for use in England

ONLINE VERSION

ONLINE VERSION

HM Government

The Building Regulations 2010

Conservation of fuel and power

APPROVED DOCUMENT

L

Volume 2: Buildings other than dwellings

Requirement L1: Conservation of fuel and power

Requirement L2: Onsite generation of electricity

Regulations: 6, 22, 23, 24, 25, 25A, 25B, 26, 26C, 27, 27C, 28, 40, 40A, 43, 44 and 44ZA

2021 edition – for use in England

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These changes only effect new and existing buildings in England.

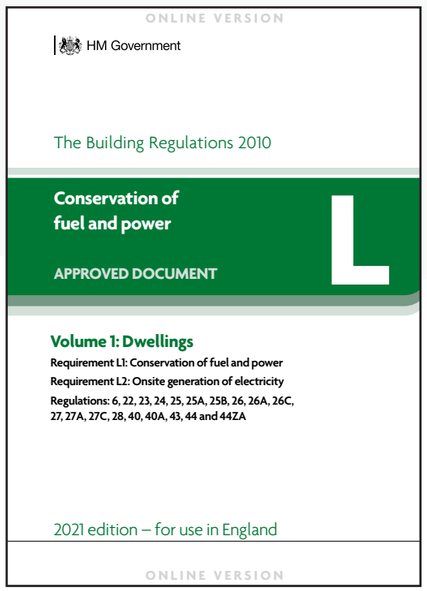
PART L

These changes come into effect for all 5 documents from the 15th June 2022.
The exact wording within these documents on how they will come into effect is as follows:

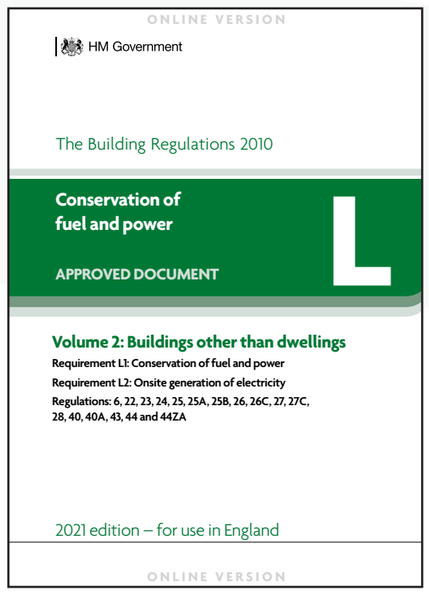
“This approved document takes effect on the 15 June 2022 for use in England. It does not apply to work subject to a building notice, full plans application or initial application.”

The approved documents for Part L were previously split into 4 different documents differentiating between documents for dwellings and buildings other than dwellings as well as new and existing buildings. These have now been replaced and are two simple volumes.

Volume 1:
Dwelling



Volume 2:
Buildings other than dwellings



PART L
WHAT IS IT AND WHY DOES IT AFFECT US?

The newest version of the Part L documentation aims to drive home the emphasis on providing energy efficient buildings as the industry moves towards a greener future. There are several targets in place in the new documentation to achieve this.

It is now a legal requirement to be equal or better than the notional building.
You must now comply with or better the following items in each respective volume:

Part L Approved Document Volume 1:
Dwelling

- Dwelling Primary Energy Rate
  (kWh_{PE}/m^2 per annum)
- Dwelling Emission Rate
  ($kgCO_2/m^2$ per annum)
- Dwelling Fabric Energy Efficiency Rate
  (kWh/m^2 per annum)

Part L Approved Document Volume 2:
Building other than dwelling

- Building Primary Energy Rate
  (kWh_{PE}/m^2 per annum)
- Building Emission Rate
  ($kgCO_2/m^2$ per annum)

In addition to this all buildings must be designed to be ‘Nearly zero energy’

Nearly zero-energy buildings are achieved by matching the notional building rates listed above and carrying out an analysis of high-high efficiency alternative systems.

PART L
WHAT ARE THE CHANGES?

In response to changes in the way energy is produced the CO_2 emission and primary energy factors used to convert between kWh and kCO_2/kWh have been updated:

CO_2 emission factors

	Current	Previous
Fuel Type	$kgCO_2$/kWh	$kgCO_2$/kWh
Natural Gas	0.210	0.216
LPG	0.241	0.241
Biogas	0.024	0.098
Fuel oil	0.319	0.319
Coal	0.375	0.345
Anthracite	0.395	0.394
Manufactured smokeless fuel (inc. Coke)	0.366	0.433
Dual Fuel (mineral + wood)	0.087	0.226
Biomass	0.029	0.031
Waste heat	0.015	0.058

Primary energy factors

	Current	Previous
Fuel Type	kWh_{PE}/kWh	kWh_{PE}/kWh
Natural Gas	1.126	1.22
LPG	1.141	1.09
Biogas	1.286	1.10
Fuel oil	1.180	1.10
Coal	1.064	1.00
Anthracite	1.064	1.00
Manufactured smokeless fuel (inc. Coke)	1.261	1.21
Dual Fuel (mineral + wood)	1.049	1.02
Biomass	1.037	1.01
Waste heat	1.063	1.34

PART L
WHAT ARE THE CHANGES?

Grid supplied electricity, grid displaced electricity and grid displaced electricity generated by PV now have different fuel conversion factors depending on each month. In previous versions of the regulations grid supplied electricity and grid displaced electricity was the same (0.519 $kgCO_2$/kWh and 3.07 kWh/kWh respectively). The different factors applied to each month and the tariff selected are as follows:

CO_2 emission and primary energy factors for grid-supplied electricity and grid-displaced electricity EXCEPT that generated by PV systems												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
$KgCO_2kWh$	0.163	0.160	0.153	0.143	0.132	0.120	0.111	0.112	0.122	0.136	0.151	0.163
$KgCO_2kWh$	1.602	1.593	1.568	1.530	1.487	1.441	1.410	1.413	1.449	1.504	1.558	1.604

CO_2 emission and primary energy factors for grid-displaced electricity by generation from PV systems												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
$KgCO_2kWh$	0.196	0.190	0.175	0.153	0.129	0.106	0.092	0.093	0.110	0.138	0.169	0.197
$KgCO_2kWh$	1.715	1.697	1.645	1.567	1.478	1.389	1.330	1.336	1.405	1.513	1.623	1.718

The fuel conversation factors are the same for both residential and commercial buildings but residential offerings have additional fuel conversion factors for electricity depending on the fuel tariff applied.

PART L
WHAT ARE THE CHANGES?

The new Approved Documentation no longer uses separate compliance guides and incorporates required values for limiting plant and fabric within these documents.

The limiting U-Values have been updated as follows and include the notional building to show what proposed buildings will be compared against:

Volume 1
Residential limiting U-Values

	Current	Previous	Notional
Element type	Maximum U-Value(1) W/(m²·K)	Maximum U-Value(1) W/(m²·K)	Maximum U-Value(1) W/(m²·K)
All roof types (2)	0.16	0.20	0.11
Wall (2)	0.26	0.30	0.18
Floor	0.18	0.25	0.13
Party wall	0.20	0.20	0.0
Swimming pool basin (3)	0.25	0.25	0.15
Window (4)(5)	1.6	2.0	1.2
Rooflight(6)(7)	2.2	2.0	1.7
Doors (including glazed doors)	1.6	2.0	1.0
Air permeability	8.0m³/(h.m²)@50Pa 1.57m³/(h.m²)@4Pa	10.0m³/(h.m²)@50Pa	5.0m³/(h.m²)@50Pa

Volume 2
Commercial limiting U-Values

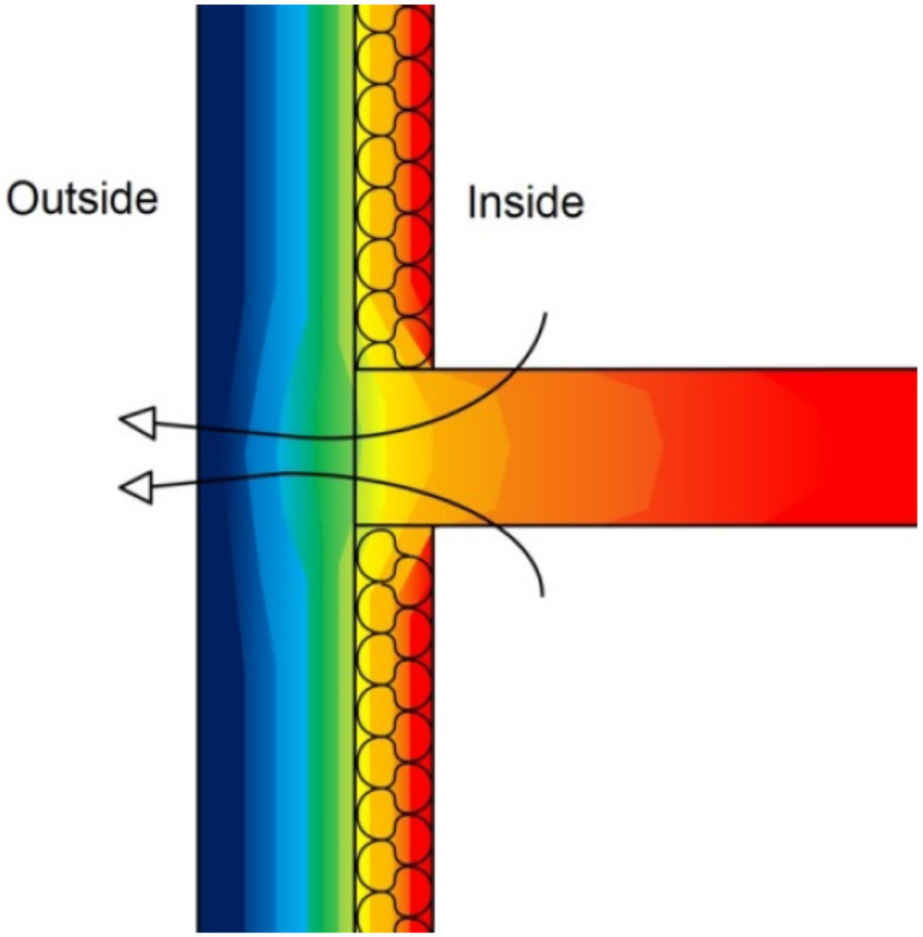
	Current	Previous	Notional
Element type	Maximum U-Value	Maximum U-Value	Maximum U-Value
Roof (flat roof)(2)	0.18	0.25	0.15
Roof (pitched roof)(2)	0.16	0.25	0.15
Wall (2)(3)	0.26	0.35	0.18
Floor (4)(5)	0.18	0.25	0.15
Swimming pool basin(6)	0.25	0.25	0.25
Windows in building smilar to dwellings (7)(8)	1.6 or window energy rating(9) Band B	2.2	1.4
All other windows (9)(10)(11) roof windows, curtains walling	1.6	2.2	1.4
Rooflights (12)(13)	2.2	2.2	2.1
Pedestrian doors (including glazed doors) (14)	1.6	2.2	1.9
Vehicle access and similar large doors	1.3	1.5	1.3
High-usage entrance doors	3.0	3.5	1.9
Roof ventilators (including smoke vents)	3.0	3.5	3.0
Air permeability (for new buildings)	8.0m³/(h·m²)@50Pa	10.0m³/(h·m²)@50pa	3.0m3/(h.m2)@50Pa

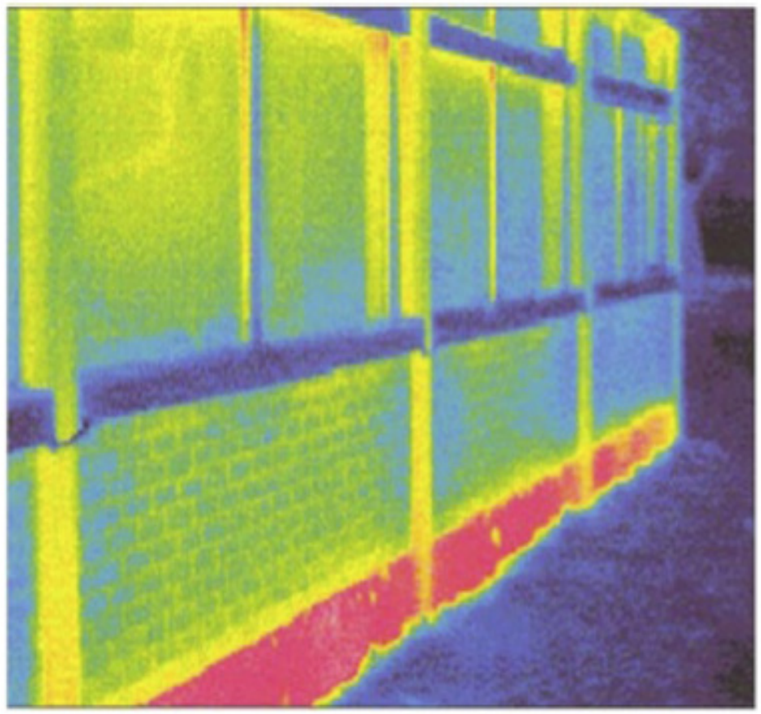
PART L
WHAT ARE THE CHANGES?

Thermal bridging

Thermal bridging occurs at junctions between different fabric elements resulting in a significantly higher heat transfer.

Previously this was always calculated for residential buildings however this must now also be calculated for commercial buildings.





PART L
WHAT ARE THE CHANGES?

System efficiencies

The system efficiencies for both dwellings and buildings other than dwellings have been improved throughout:

- There are declared insulation thickness's for pipework and thermal stores
- Improved lighting efficiencies
- Changes to the air pressure testing regime (all dwellings must now be tested not just a sample)
- Improved minimum heating, ventilation and cooling equipment efficiencies

The notional building against which these plant items are measured has also had its efficiencies improved and will now be provided with photovoltaic panels based on the usable floor area.

PART L
WHAT DOES THIS MEAN TO THE DEVELOPER?

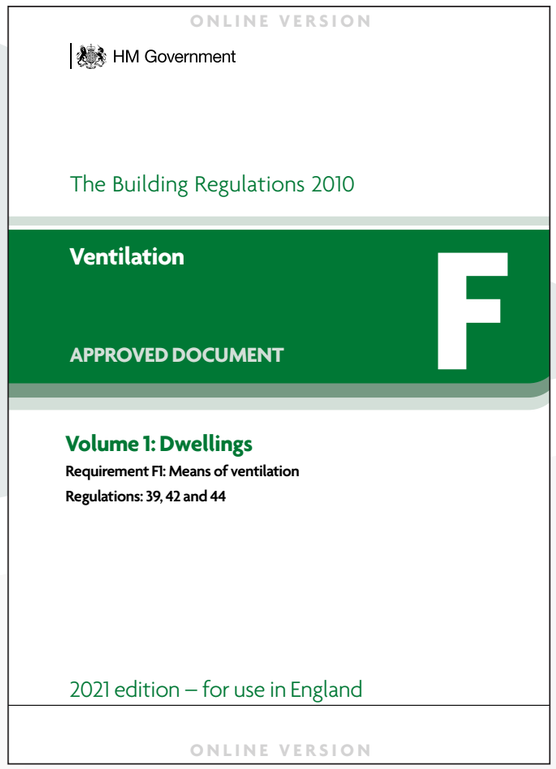
As the drive for efficiency is increased and these changes come in there are typical by products which will occur as a result which can be summarised as follows:

- Increased equipment costs
- Reduced nia - both increases in wall thickness's and potentially increases in plant areas to overcome efficiency targets to meet the new regulations
- Reduced running costs
- Greener credentials

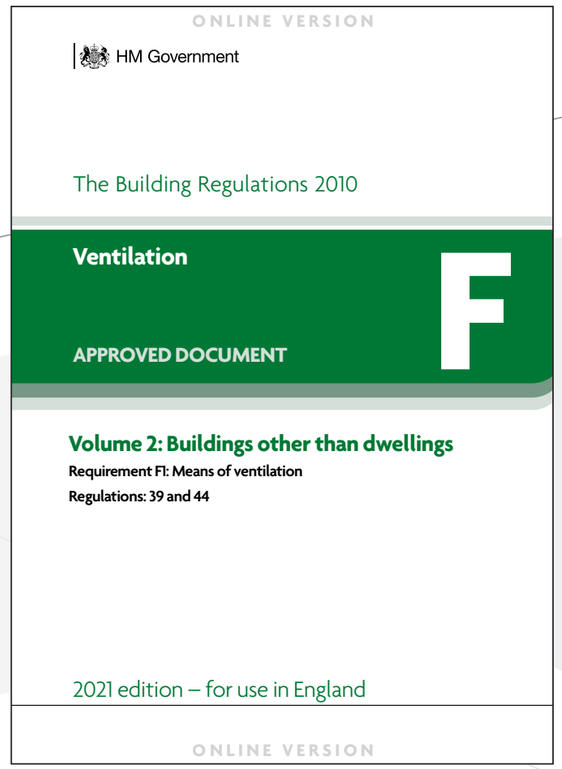
PART F
WHAT IS IT AND WHY DOES IT AFFECT US?

The Approved Documents for Part F were previously provided as a single Volume with several different sections to it. This document has now been split into two documents to cover dwellings and buildings other than dwellings to bring it in line with the Part L documentation.

Volume 1: Dwelling



Volume 2: Buildings other than dwellings



PART F
WHAT IS IT AND WHY DOES IT AFFECT US?

The latest Part L documentation aims to react and respond to recent advice in relation to airborne containments and CO_2 levels within buildings brought to the forefront of everyone's mind by the Covid 19 pandemic.

The Part F documentation makes very clear which Part F approved document should be used and when.

For example:
In a block of flats, each dwelling should be assessed using Volume 1 of the Part F documentation, where as any common areas provided should be assessed using Volume 2.

PART F
WHAT ARE THE CHANGES?

Volume 1:

- Minimum whole dwelling ventilation rates based on bedrooms alone increased
- The minimum areas for background ventilations has increased
- Advice provided to minimise pollutants and ingress of debris into the ventilation systems
- Further advice on when the Part F applies in relation to existing dwellings to ascertain whether the new regulations apply

Volume 2:

- Guidance on the provision of indoor air quality measurement and when it should be applied
- CO_2 monitoring is required for rooms greater than 125m^3 volume or 50m^2 floor area and smaller than 800m^3 volume or 320m^2 floor area
- Minimum ventilation rate of 10 l/s/person is unchanged however further stipulation of 1 l/s/m^2 added
- New requirement (in direct response to Covid 19) relating to the ventilation of corridors and lift lobbies which must now either be mechanically or naturally ventilated

PART F
WHAT DOES THIS MEAN TO THE DEVELOPER?

Similarly to the Part L regulations there are some implications of these changes:

- Increase in costs of ventilation equipment
- Requirement for indoor air quality monitoring for certain building sizes added (although we are now recommending that all projects use indoor air quality monitors)
- Ventilation to common spaces will have a major impact on all new and existing developments as they are refurbished as this is something that has a never been required before

PART O
WHAT IS IT AND WHY DOES IT AFFECT US?

As building fabric efficiencies have improved over recent years there has been a significant increase in complaints about overheating in domestic premises as a result of poor design and the desire to avoid providing comfort cooling.

Building regulations have aimed to tackle this by providing a new document (Part O) which aims to tackle this problem head on.

Part O only applies to new dwellings.

It describes simplified and complex methods of assessment and how they should be interpreted and when each method should be used.

It offers advice on overheating and how the risk can be reduced and the issues overcome.

PART O
SIMPLIFIED METHOD

The simplified method looks to:

- Categorise buildings into moderate and high risk locations
- Establish whether cross ventilation is feasible
- It then uses this to give guidance on the maximum glazing percentage based on maximum floor area and whether shading needs to take place.
- It then also goes on to describe the free area requirements for the whole dwelling and bedrooms as a percentage
- The simplified method can only be used for dwellings with one dwelling and does not use communal heating systems (with significant heating and hot water pipework in the corridors).

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

NOTE:

1. Floor area and floor area of room are as defined in Appendix A.

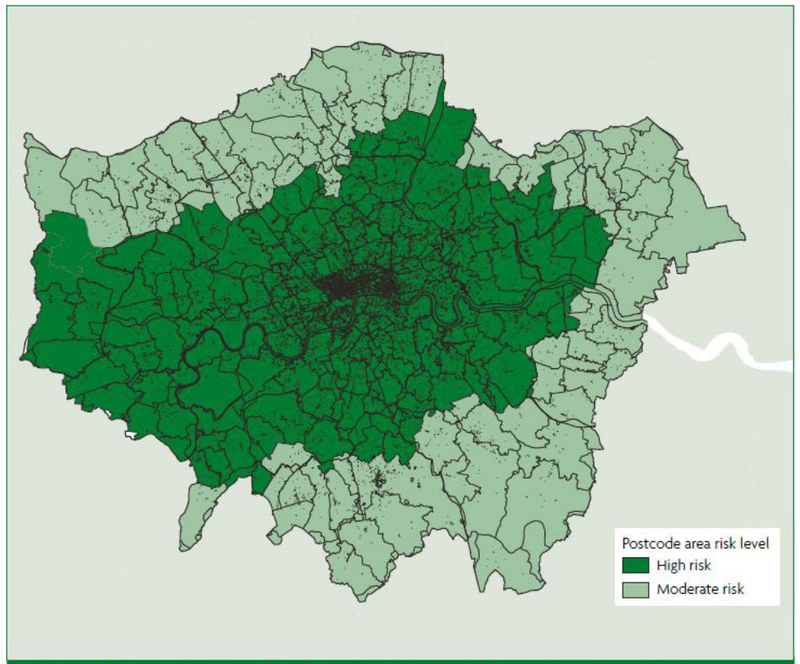


Diagram C1 Overheating risk at postcode area level in the high risk part of London

PART O
DYNAMIC THERMAL MODELLING METHOD

The use of a dynamic thermal model can offer the designer flexibility over the requirements which are stipulated within the simplified method.

The dynamic thermal modelling should follow the following principles:

- CIBSE TM59 - Design methodology for the assessment of overheating risk in homes
- Limits set out in CIBSE TM59
- Further acceptable strategies for reducing overheating

Building control will require a report that shows the TM59 assessment of overheating has been carried out.

Mechanical cooling can only been considered once it has been demonstrated the requirements of the Approved Document cannot be achieved using passive means.

The following items need to be considered when assessing the method of overheating mitigation:

- Noise
- Pollution
- Security
- Protection from falling
- Protection from entrapment

PART O
DYNAMIC THERMAL MODELLING METHOD

The regulations stipulate more closely items from Section 3.3 of TM59 which are often left to the interpretation of the modeller:

“ 2.6 All of the following limits on CIBSE’s TM59, section 3.3, apply.

a. When a room is occupied during the day (8am to 11pm), openings should be modelled to do all of the following:

i. Start to open when the internal temperature exceeds 22°c.
ii. Be fully open when the internal temperature exceeds 26°c.
iii. Start to close when the internal temperature falls below 26°c.
iv. Be fully closed when the internal temperature falls below 22°c.

b. At night (11pm to 8am), openings should be modelled as fully open if both of the following apply.

i. The opening is on the first floor or above and not easily accessible.
ii. The internal temperature exceeds 23°c at 11pm.

c. When a ground floor or easily accessible room is unoccupied, both of the following apply.
i. In the day, windows, patio doors and balcony doors should be modelled as open, if this can be done securely, following the guidance in paragraph 3.7 below.
ii. At night, windows, patio doors and balcony doors should be modelled as closed.

d. An entrance door should be included, which should be shut all the time.”

PART O
ACCEPTABLE MITIGATION MEASURES

The following mitigation measures are suggested by the documentation:

<u>Limiting solar gains</u>

- Shutters
- External blinds
- Overhangs
- Awnings
- Reducing glazing size
- Reducing glazing g-value
- Changing glazing orientation
- Changing depth of window reveal
- Using balconies

<u>Removing excess heat</u>

- Opening window sizes
- Cross ventilation
- Ventilation louvres
- Mechanical ventilation
- Mechanical cooling

PART O
WHAT DOES THIS MEAN TO THE DEVELOPER?

The changes to Part O will have the following effects to developers and developments moving forward:

- Provision of additional passive ventilation measures
- Less flexibility with building design
- Increased design costs as overheating looks to be mitigated
- Increased build costs as additional ventilation equipment, fans and even cooling could potentially be required

ANY QUESTIONS?

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