

Guide to changing Building Regulations



What you need to know?

As property developers, we know we need to be on the front foot to keep up..."

The new Building Regulations comprise five new Approved Documents, including:

- Approved Document L, volume 1: dwellings (Conservation of fuel and power)
- Approved Document L, volume 2: buildings other than dwellings
- Approved Document F, volume 1: dwellings (Ventilation)
- Approved Document F, volume 2: buildings other than dwellings
- Approved Document O (Overheating)

Implementation Period

- It will come into effect on 15th June 2022, and will have a marked impact on new homes and existing homes, extensions and also non domestic buildings.
- New regulations do not apply to work of which building notice has been submitted before the 15th June 2022 (Providing the work is started before June 15th 2023)

What if my building is currently in the planning process?

If a building notice, initial notice, or full plans are submitted before 15 June 2022, they will still be considered under the previous regulations, provided building work starts before 15 June 2023. For new housing developments that gained planning permission under the old regulations, work must have been started on a unit by 15 June 2023 or the new regulations will apply. Developers must submit their Building Notices, Initial Notices or deposit their Full Plans application by June 2022 or comply with the new regulations set out in Approved Documents.

For new builds, the date applicable is from the date of building application.

For work that falls under these new regulations, but are not subject to notices or applications, there are no transitional arrangements. This means the new rules must be followed from 15th June 2022.

FUTURE HOME STANDARD

The Department for Levelling Up, Housing and Communities are bringing in the changes as part of a longer-term plan to reach net zero carbon emissions. The significant update provides an uplift to existing energy efficiency standards for homes, and marks a stepping stone towards the introduction of the **Future Homes Standard** in 2025. The hope is that these measures will make the changes in 2025 less severe. Introduced regulations are expecting carbon emissions to be reduced by 30%. Future Homes Standard in 2025 is expecting 75-80% reduction.

What is the latest?

The changes to the Building Regulations were published alongside the government's response to the second Future Homes Standard consultation (called the Future Buildings Standard) from earlier this year.

As part of the response, it was confirmed that in 2023 a full technical consultation for the launch of the Future Buildings Standard will begin, ahead of the Standard's introduction in 2025.

What are the key aims?

1. **reduce emissions**
2. **improve ventilation**
3. **prevent overheating**

Under the new rules...

The Approved Document O

- In new homes, which will include self build homes, there will be new regulations to mitigate the risk of overheating, these fall under newly created Part O measures. **An entirely new Building Regulation and Approved Document O has been created to mitigate the risk of overheating in new homes.** It states that dwellings, or other buildings containing rooms for residential purposes, should make reasonable provision to:

- Limit unwanted solar gains in summer
- Provide an adequate means to remove heat from the indoor environment

Compliances with this requirement can be shown by using one of the following two methods:

1. The Simplified Method for Overheating Compliance

To Carry out the simplified method, the location of the development must first be determined as either "moderate" or "high" risk. Majority of London postcodes and some parts of Central Manchester are amongst high risks locations.

The Approved Document O provides postcodes of "high risk" areas within Appendix C.

The development then has to be categorised as either **having cross ventilation or not**. Note, **cross ventilation assessments for multi-occupancy residential buildings** should not be made for buildings as a whole but **should be made on the individual dwellings themselves**.

One key inclusion is that maximum limits have been set to the amount of glazing permitted. based on the building orientation, this is to limit solar gains.

Residential buildings in high risk locations may need to provide shading for east, south and west facing glazing by installing external shutters with means of ventilation; using glazing with maximum G-Value of 0.4 and a minimum light transmittance of 0.7; designing overhangs with 50 degrees altitude cut-off on due south facing facades.

The simplified method CANNOT be used in residential buildings that contain more than one unit, that share a communal heating or hot water system and which have a significant amount of horizontal heating or hot water distribution pipe work. Main pipework should run through vertical risers instead.

O

PART

P

2. The Dynamic Thermal Modelling Method for Overheating Compliance

If the simplified method is too prescriptive and the building designer/architect would like to design a building outside of these limits, then the Dynamic Thermal Modelling method can be used as an alternative for showing compliance.

The Dynamic Thermal Model must undergo and satisfy a CIBSE TM59 overheating assessment. It should follow the methodology of CIBSE TM 59 whilst also allowing for some limits set out within the Approved Document. For example, the Approved Document states the internal temperatures that must be used to simulate when a window begins to open or close. It also states the occupied hours to use during the day and night, and gives alternative guidance for ground floor windows that should be closed overnight for security purposes.

- Another part of **The Approved Document O focuses on the removing of excess heat.** The Approved Document O suggests either opening windows, installing ventilation louvres, a mechanical ventilation system, or a mechanical cooling system. Although, all passive means of removing excess heat from the building must be used as far as practically possible before the inclusion of a mechanical cooling system is used. The amount of noise and pollution near the home needs to be taken into consideration when devising overheating strategies. **Noisy is defined as 40dB LAeq, T over 8 hours '2300-0700' & 55dB LAFmax,** more than 10 times a night. It may be required to have a noise assessment performed to demonstrate these values are not exceeded. **Overheating strategies must be able to be safely operated by residents.** Providing the means to remove excess heat whilst limiting reliance on energy consuming air conditioning is a key.
- The free area established in both the simplified and dynamic model approach must account for the security risk of leaving windows open during sleeping hours. This is true for ground floor bedrooms and easily accessible bedrooms. Measures like fixed or lockable louvred shutters, window grills or railing should be incorporated. Units near significant local pollution should follow Approved document Part F to reduce the intake of pollutants.

How do I comply?

When using Simplified Method, Part O appendix B provides a checklist that can be filled out and then provided to building control to demonstrate compliance. When using Dynamic Thermal Modelling, the assessor can provide you with a CIBSE TM59 assessment report to pass on to building control, which will demonstrate Part O compliance.

The Approved Document L

- **Approved Document L covers the requirements for the conservation of fuel and power in both dwellings and buildings other than dwellings.** Through enhanced building design, energy efficient HVAC services, and renewable technologies, any new dwellings or commercial buildings should be a nearly zero energy building and be zero carbon ready.
- **Perhaps the most significant change in the Part L Approved Document is the reduction in CO₂ emissions required in new homes.** There will be a requirement for new homes to produce 30% less CO₂ than current standard, as well as a 27% cut of emissions on other types of new buildings including offices and shops
- For the most part, the changes focus on the fabric performance of the building, with **standards for U-Values, thermal bridging calculations, and air-testing all being tightened.** All new homes will have to adopt the Fabric Energy Efficiency Standard to measure energy efficiency. There will also be **a new efficiency metric for the whole house calculation method for new extension.** New performance metric called 'Primary energy' will be used to measure the efficiency of a building's heating, as well as the energy used to deliver fuel to the building, and even the efficiency of the power station supplying the electricity. The Target Primary Energy Rate is the maximum primary energy use that will be allowed for in a dwelling or building in a year in order to satisfy Part L, it is expressed as kWhPE/(m².year).
- **New Rules for Extensions**, previously, for an over-glazed extension to pass an analysis, the total CO₂ emission rate was the only metric from the 'as designed' dwelling required to gain a pass. Now though, a primary energy metric has been introduced to the whole house calculation method for extensions. This metric will look at the sources of energy into the home and how it was produced and delivered to the dwelling.

Enhanced U-Value Standard

One of the most obvious changes from the old regulations to the new is the **improvement in U-Value standards for new building elements**. These are the minimum requirements for the average U-Value of various elements in the building fabric. These values are also used to ensure that new build dwelling elements meet an improved minimum standard in comparison with the standards of previous regulations.

This table shows the limiting U-Value standards for new building elements:

Building Element	Part L1 2013 U-Value (W/m ² K)	Part L1 2021 U-Value (W/m ² K)
Wall	0.30	0.26
Floor	0.25	0.18
Roof(s)	0.18 – All Roof Types	0.16 – All Roof Types
Glazing	2.00 – Windows	1.60 – Windows
	2.20 – Rooflights	2.20 – Rooflights
	1.80 – Doors	1.60 – incl. glazed doors

Expected thermal elements U-Values Part L1 2022 (W/m²K)

Wall	0.18
Floor	0.13
Roof	0.11 – All Roof Types
Glazing	1.20 – Windows
	1.70 – Rooflights
	1.20 – Doors

- **In existing homes, standards have been raised to reduce energy use and carbon emissions during home improvements**
- **Change in Fuel Carbon Factors will cause the biggest impact on the type of heating systems installed within new dwellings.** The fuel factor for electricity is reducing from 0.519 kg CO₂ per kWh to 0.136 kg CO₂ per kWh, whereas mains gas is going from 0.216 kg CO₂ per kWh to only 0.210 kg CO₂ per kWh. **This means that installing Solar PV Panels on a dwelling will no longer have such a significant impact on reducing emissions.**
- **Gas and oil boilers will be phased out and banned in new build homes in 2025.** There will be a requirement for new or replacement heating system designs to accept low-carbon heating in future, including integrating the latest Eco design appliance benchmarks

- An appendix has been included in Part L which sets out a good practice specification for a home built with a heat pump. This proposal is to encourage the installation of ground source heat pumps which will allow solar panels to be removed from the design and enable greater flexibility in the specified U-Values of the individual thermal elements. We can expect that under the 2025 Future Home Standard, CO₂ emissions will be at least 75% lower than homes built today; and that **heat pumps are to become the primary heating technology for new homes under the Future Homes Standard.**
- Photovoltaics – proportional to the ground floor area (e.g. 50m² GFA will require 3kW peak solar panels equal to approx. 18m² (assumed to SE/SW orientation))
- **Waste water heating recovery to ALL showers**
- **Changes to Air-Testing**, previously, air-tests were only required on a sample of dwellings in a development, and units that were not based on a sample were penalised by two points in the air test result. **Following the changes, every dwelling will need to be air tested.** This is intended to improve the construction standards of new build properties. Under the new regulation 2021 Part L guidance all dwellings must now be tested for their air permeability **and need to achieve a value of no worse than 8 m³/(h.m²) at 50Pa (or they can achieve a value of 1.57 m³/(h.m²) at 4Pa under the new Pulse Test).** Although a value no worse than 8 m³/(h.m²) at 50Pa is required, if you look at the notional specification you can see that it uses a value of 5 m³/(h.m²) at 50Pa. Therefore to ensure that your proposed dwelling achieve a pass under the SAP calculation you should really be targeting air permeability values better than this. However, it is worth mentioning that in accordance with the new Part F 2021 Building Regulations only buildings with an air permeability of higher than 3m³/(h.m²) at 50Pa can use a natural ventilation and intermittent extract fan ventilation design. If your dwelling achieves better than this then you will need to install a continuous mechanical extract system or a whole house mechanical ventilation heat recovery system. This could lead to a scenario where a naturally ventilated dwelling is made to be less air tight on completion in order to comply with the Part F Regulations. This may seem counter-intuitive and will cause an increase in energy consumption, however it will ensure that the building is properly ventilated and avoid other issues such as condensation.

- **Changes to Thermal Bridging**, perhaps the most significant change comes in the form of **new methods of calculating thermal bridging**; the current Accredited Construction Details, published in 2002, are significantly outdated and a more detailed calculation is now required. With the introduction of the new regulations and SAP 10, **ACD's (Approved Construction Details) have been removed, and architectural designers will need to detail their drawings to a certain specification such as those from manufacturers, or bespoke calculations will have to be made for each junction**. Many insulation manufacturers publish details specific for their products. Under the latest regulations it will be extremely important for developers to either use a construction method that has their junction Psi values already calculated (such as Kingspan's Tek Building System) or they will need to get their junction Psi values specifically calculated. This is because, although default Psi value details can still be used under Part L 2021, they will be considerably worse than the notional buildings Psi values and therefore it will be extremely difficult for a dwelling to pass the SAP calculation using only default Psi Values.

Changing heating systems

What will complete new system installations require?

- An appropriate heat loss calculation for the dwelling
- A system sizing methodology that takes account of the properties of the dwelling, such as the Chartered Institute of Plumbing and Heating Engineering's Plumbing Engineering Services Design Guide
- The system should be designed to operate at a 55°C heating flow temperature

What will boiler swaps require?

- Where a combination boiler is used, the boiler type should be selected to modulate down to the typical heating load of the dwelling
- Document BS 7593:2019 – Code of practice for the preparation, commissioning and maintenance of domestic central heating and cooling water systems – has been incorporated into Part L guidance, so what was best practice advice will become a requirement
- Existing non-domestic buildings must improve the efficiency of heating and hot water boiler systems through the installation of new controls.

What does this mean for installers?

As well as cleansing and flushing the system when installing a new boiler to remove debris and sludge and then treating the water with inhibitors, an in-line filter must be installed in the circuit to capture particles and prevent them from entering the boiler.

Sludge and debris in the system is a major cause of boiler breakdowns. By installing a filter to prevent the build-up of sludge, heating systems will be more energy efficient and reliable, leading to lower fuel bills, reduced breakdowns and lower carbon emissions.

Photographic Evidence under the Part L

- **Photographic Evidence under the Part L 2021 Building Regulations requirements** - it will also be extremely important to take photographs of each of the dwellings junctions once they are constructed showing continuity of insulation, as well as photographing the installed building services. These photographs must be clearly labelled, with correct Meta Data showing the time and location of when and where they were taken. The energy assessor on the project must ensure that what has been allowed for the dwelling at As Designed stage has actually been installed at the As Built stage. If this evidence is not provided to the energy assessor, or it is of an inadequate quality, then default values may have to be used and that could cause the dwelling to fail. In the worst case scenario your en would not be able to sign off the SAP calculation as complete, which would mean that Building Control would not be able to sign off the dwelling either without expensive remedial work to get the evidence required.

- Part F of the Building Regulations is very closely linked with Part L (conservation of fuel and power) as both are being improved to meet the Governments Future Homes Standard. One way of improving energy efficiency is to reduce the heat loss through air permeability, this means building more air tight homes. However, an increased air tightness leads to reduced ventilation and therefore Part F has been updated to ensure that sufficient levels of ventilation are still provided.
- **The required extract rates for intermittent extract systems will remain the same under the 2021 Part F Approved Document. Kitchens will still require 30 l/s extract if adjacent to the hob or 60 l/s if located elsewhere. Utility rooms will still requires 30 l/s, bathrooms will still require 15 l/s, and Toilets will still require 6 l/s**
- The required continuous extract minimum high rates also remain the same under the 2021 Part F Approved Document. Kitchens will require 13 l/s, Utility Rooms and Bathrooms 8 l/s, and Toilets will require 6 l/s. The sum of all extract ventilation also known as the minimum low rate should also at least meet the required whole dwelling ventilation rate.
- **Whole dwelling ventilation rates that are determined by the number of bedrooms have changed. There is now a much higher minimum whole dwelling ventilation rate required.**
- Under the new 2021 Part F Approved Document the use of intermittent extract fans and natural ventilation through background ventilators is only recommended for less airtight dwellings. These are dwellings that will aim to have a design air permeability of greater than 5 m³/(h.m²). Due to the new Part L Building Regulations, having such a high design air permeability will make achieving the carbon reduction targets extremely difficult and therefore it is expected that all newly design dwellings will be classified as Highly airtight dwellings with an air permeability of less than 5 m³/(h.m²). Nevertheless, if a dwelling is classified as less air tight the minimum equivalent area of background ventilators required has been changed in the new 2021 Part F Approved Document. **Under the new 2021 Part F Approved Document the minimum required area for background ventilators is now taken over a room by room bases.** For continuous mechanical extract systems the current Part F requires a minimum equivalent area of 2500mm² to be fitted in each habitable room, except wet rooms. Under the new 2021 Part F Approved Document this has been increased to 4000mm².