



Overheating, Part O, and PHPP

Passivhaus Trust Position Paper

August 2023

Summary and Recommendations

1

We are facing escalating temperatures and evolving building regulations to managing overheating risk

2

PHPP is a proven tool, offering an easy-to-use, accurate, and comprehensive approach to assessing overheating risk

3

PHPP should be accepted as an alternative means of compliance for Part O and has already been agreed as deemed to satisfy by several Building Control services

4

PHPP's implementation ensures buildings meet high standards of thermal comfort and performance, effectively addressing the challenges posed by our warming climate

June 2023 has now been confirmed as the hottest on record for the UK, and July 2023 the hottest month globally, with much of Europe experiencing extreme heat. These record temperatures bring home the importance of managing overheating in our buildings both now and in the future.

Good glazing provides daylight, views, and ventilation, but too much can mean high solar gains in summer and heat losses in winter. These, sometimes opposing, factors need to be carefully balanced to provide a comfortable, healthy internal environment for people to live and work in. Overheating risk is already problematic in both new and existing buildings, and as summer temperatures rise, this risk will increase. In response to this, the UK government introduced the new Approved Document Part O and set building regulations in England to *'Protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures'* through limiting solar gains and providing adequate means to remove excess heat in new dwellings.

Methods of compliance

Within Part O two main methods are specified to show compliance:

1. The Simplified Method – no specialist knowledge or training is required to complete this assessment, and compliance is based on maximum glazing areas and minimum areas of openable windows. These areas depend on two criteria:

- the building location, which is either specified parts of London and central Manchester (high risk) or the rest of the country (moderate risk), and
- the presence of cross ventilation.

Only dwellings in high risk locations need to reduce solar gains through external shading, low-g glazing or overhangs (due south façade only), which must be included, but no additional modelling is required to test their effectiveness.

2. The Dynamic Thermal Modelling Method uses CIBSE TM59 methodology, and specialist software (and skills) are needed. This allows a more flexible approach to compliance but is more complex and costly. TM59 has maximum internal temperature thresholds using several criteria. This method is recommended for:

- residential buildings with very high levels of insulation and airtightness i.e., all Passivhaus
- residential buildings with specific site conditions i.e., in city centre locations, but outside of London
- residential buildings that are highly shaded by their surroundings.

In addition, Dynamic Thermal Modelling must be used when

- the building contains more than one residential unit and there are significant amounts of communal hot water pipes in corridors
- night-time noise limits will be exceeded or there is external pollution and windows cannot be opened at night.

Alternative methods of compliance are possible but not specified in Part O. These should be discussed and agreed with a Building Control body before work starts. The Passive House Planning Package (PHPP) is readily available, affordable software and has already successfully been used as an alternative means of compliance with some Building Control bodies. Guidance on assessing overheating risk in PHPP and a free overheating plug-in is available, and PHPP offers the following advantages over the Simplified Method:

- The building will be in the correct climate zone. The overheating risk for a building located in the south and the north will be very different. This means that overheating risk may be underestimated in some instances and overestimated in others using the simplified method. PHPP allows you to correctly assess the risk.
- External shading devices, low-g glass and overhangs can be properly tested for all façade orientations and modelled to ensure they work effectively in both high and medium risk locations.
- Window opening and cross ventilation for both daytime and nighttime ventilation can be easily modelled.
- Overheating risk is automatically calculated as part of the assessment. PHPP also provides a risk assessment of the strategy and shows the impact of warmer summers, higher internal gains, reduced windows opening or use of shading devices.

In addition to the above, PHPP offers the same advantages as Dynamic Thermal Modelling:

- Shading from surrounding buildings and landscape can be included.
- Air movement from continuous mechanical extract ventilation is assessed.
- Heat losses from hot water pipework, both individual and communal, are calculated.

PHPP has already been accepted as an alternative means of compliance with at least three building control services, including Stratford Council and Total Building Control.

Therefore, a precedent has already been set which we will continue to build on.

We therefore propose that PHPP be used as alternative means for compliance in place of

1. the simplified method
2. the dynamic method for single-family dwellings and simple building forms.

There will be some instances when the dynamic method is more appropriate, for example complex buildings, multi-residential buildings, etc. For project teams that are pursuing Passivhaus certification in these scenarios, the UK Certifiers' Circle have developed guidance to establish a common approach to modelling, reporting and user handover. This is freely available to download at <https://pht.guide/DynamicThermalModelling>.

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