

# Thermal performance

An independent, correctly installed and sealed secondary window frame will minimise air leakage; it also ‘traps’ an insulating layer of air that can reduce heat loss by up to 50% using standard glass and 65% with low-E glass.

Furthermore, sealed unit glazing, available with selected systems, creates triple glazing and even higher levels of insulation. The result is a more comfortable living or working environment with reduced energy demand.

## Why improve?

**The 2008 Climate Change Act** committed the UK to reduce greenhouse gas emissions by 80% against 1990 levels by 2050. Since buildings account for 40% of emissions and 80% of existing stock will still be standing in 2050, retrofit solutions will be essential if the targets are to be met.

**Building Regulations Approved Document L: Parts L1B and L2B** cover the energy efficiency in buildings undergoing renovation or upgrade. Controlled fittings such as windows must meet strict performance standards, but the regulations acknowledge the sensitivity of working on Listed buildings. Hence, single-glazed windows that are part of the historic fabric of the building can be retained and secondary windows incorporating low-emissivity glass fitted, subject to Listed Building Consent.

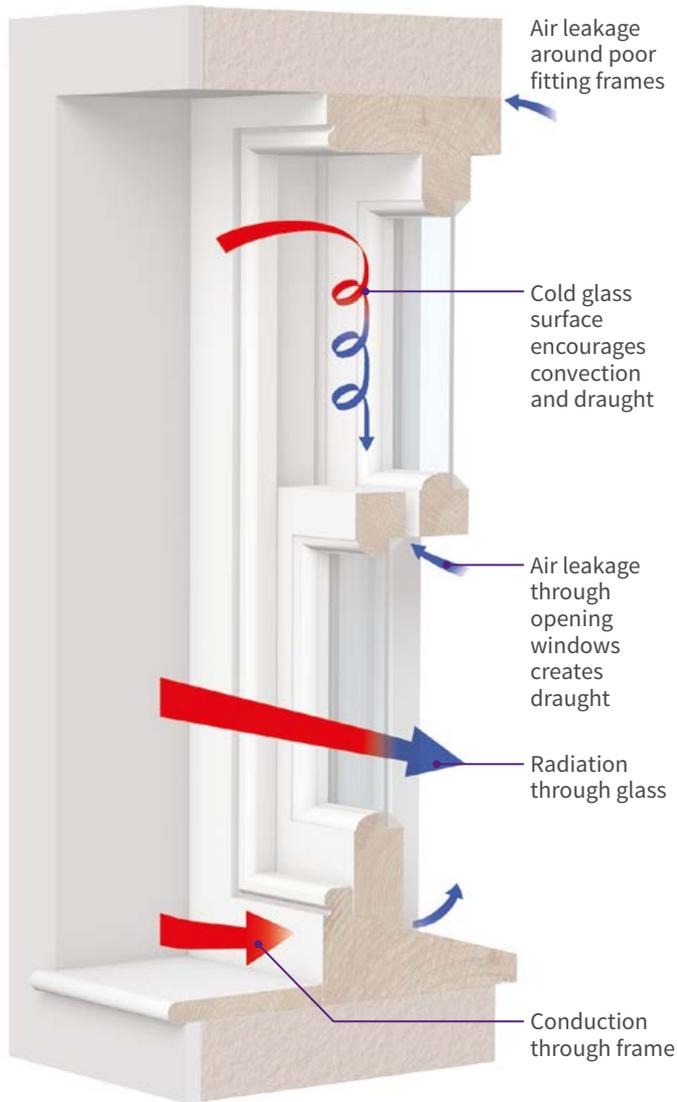
**Energy Performance Certificates (EPC)** are required when a building is constructed, sold or rented to identify its energy performance rating. Low rated buildings may prove more difficult to sell or lease and after April 2018 it will be unlawful to let those with the lowest ratings, F or G. Retrofitted secondary glazing can be an important factor in maintaining the building’s use.

**BREEAM** is the UK’s leading assessment method for sustainability in buildings and addresses many issues including energy, health and wellbeing. Secondary glazing can effectively contribute towards a higher rating.

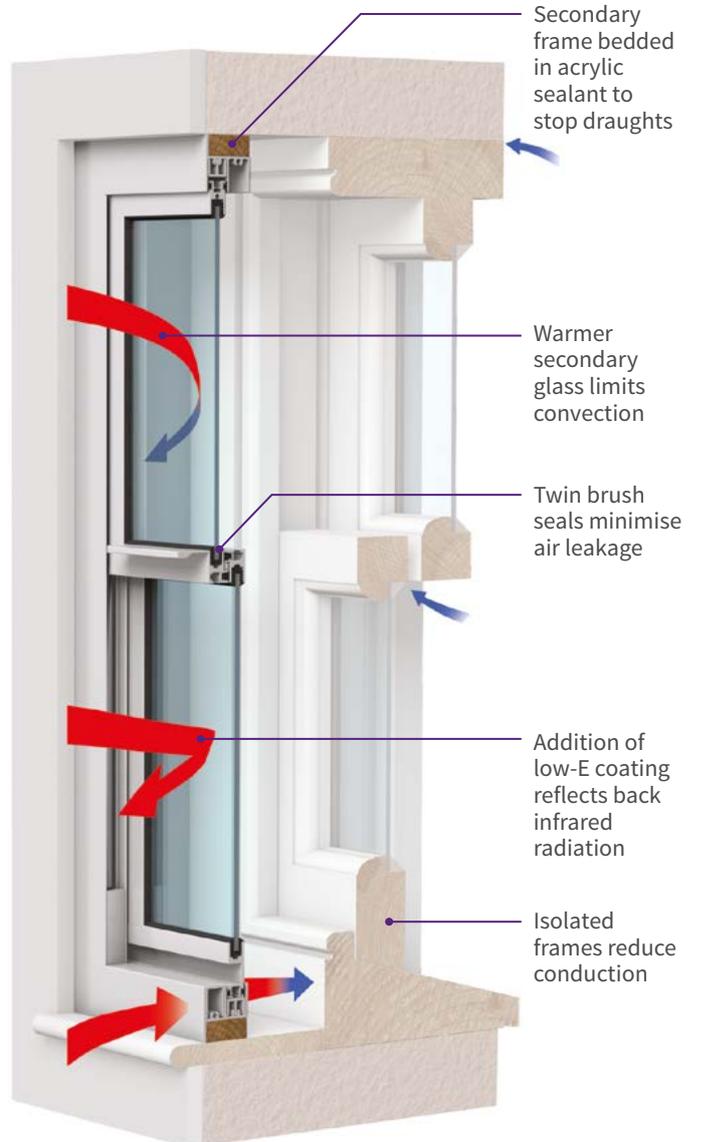


# How secondary glazing improves thermal performance

## Original window...

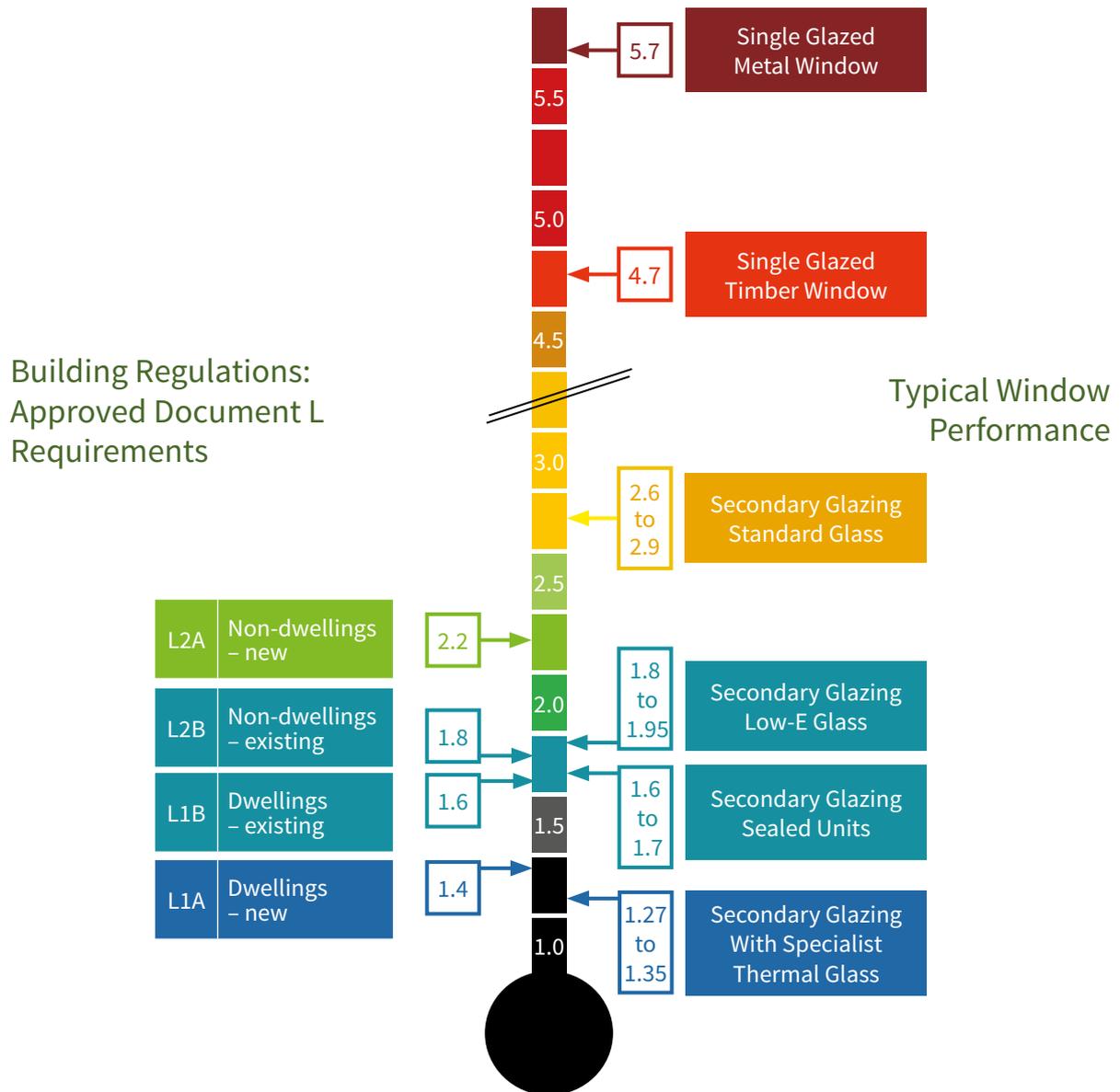


## ...with secondary glazing



The secondary window traps an insulating mass of air between the inner and outer glass and the resulting warmer surface of the inner glass limits convection currents. Isolated frames are also less conductive and draughts are significantly reduced by efficient seals applied both to the frame and opening panels. If a low-E coating is applied to the inner glass, it will reflect back infrared radiation and so retain energy in the room.

# Zero in on U-values



## Notes

**U-value** is a measure of heat loss expressed in  $W/m^2K$  and shows the rate of heat loss per  $m^2$  of material when the temperature difference between inside and outside is one degree. The lower the rating the better the insulation. As secondary glazing is used in combination with primary windows, U-values are normally calculated using modelling software.

**Low-E glass** has a hard metallic coating on the surface facing the cavity, which significantly helps with heat containment. There is a small reduction in light transmittance and a slight roughness on the coated surface, which can lead to light scatter and may be visible as a haze when the sun is strong and low. This is not a defect in the glass. The coated surface should be cleaned occasionally with a lint free cloth and clean soapy water. Abrasive materials must not be used.

**Solar gain** is the warming effect of the sun which can be a benefit in the winter but a problem in the summer months. The g-value measures the amount of solar energy transmitted through a material with 0 representing no transmittance and 1 the maximum. A standard glass achieves 0.8 but when lower levels are needed, for example on a south facing façade, a specialist window film can be applied to the primary window.

## Testing and certification

The thermal performance of the product range has been assessed against both timber and metal primary windows by the Centre for Windows and Cladding Technology (CWCT).

Please visit our website for performance figures. Summary tables are on page 49.

# Case study: John Street, London

An historic Listed Georgian townhouse in London's Bloomsbury has been transformed into a comfortable, peaceful and energy efficient home that approaches Passivhaus EnerPHit standards.

This was achieved using modern insulation techniques including an advanced secondary glazing system from Selectaglaze that markedly improved the performance of the traditional, single glazed sash windows.

The client wished for a home that used as little energy as possible and offered the most comfortable environment. Prewett Bizley architects took on the challenge of convincing conservation officers that a Grade II Listed building could be successfully fitted with a host of energy saving measures whilst respecting all the historic features.

The large single glazed sash windows were a challenge as they represented a significant proportion of wall area and could not be replaced. The answer was secondary glazing; but the extremely high levels of insulation required, the aesthetics and the need for working shutters in some rooms demanded a bespoke solution.

Selectaglaze originally proposed a totally new design but coincidentally was both developing a new sash window design and trialling Pilkington's Spacia thin vacuum units which have a centre pane U-value of 1.0. The resulting Series 25 window proved perfect

for the project as it offered high sealing efficiency, a very low U-value and a discreet frame with a specially developed slide catch that allowed shutters to fully close. The house now has airtightness close to 1 air change/hour at test pressure which demonstrates that the secondary glazing is performing very well.

The complexity of the project and the time needed to obtain consents meant that part of the building had to be occupied before the secondary glazing was fitted. As a result, the owner experienced the change in comfort levels offered by the original window and with the secondary glazing in place. The difference was remarkable and what was also evident was the almost complete removal of road noise. This had not originally been regarded as a significant problem but the absence of noise certainly added to the comfort.

