

21st century problem

At BOC we understand the challenges faced by the double glazing industry in keeping pace with changing legislation. With our membership of the Glass and Glazing Federation (GGF) and long standing expertise in gas supply and filling we are able to help support your business adopt the revised legislation.

Improving energy efficiency

The UK government has revised legislation to reduce environmental pollution and help to conserve natural fossil fuels by tightening energy efficiency standards for windows and doors within Building Regulations Part L (England and Wales*) Conservation of fuel and power.

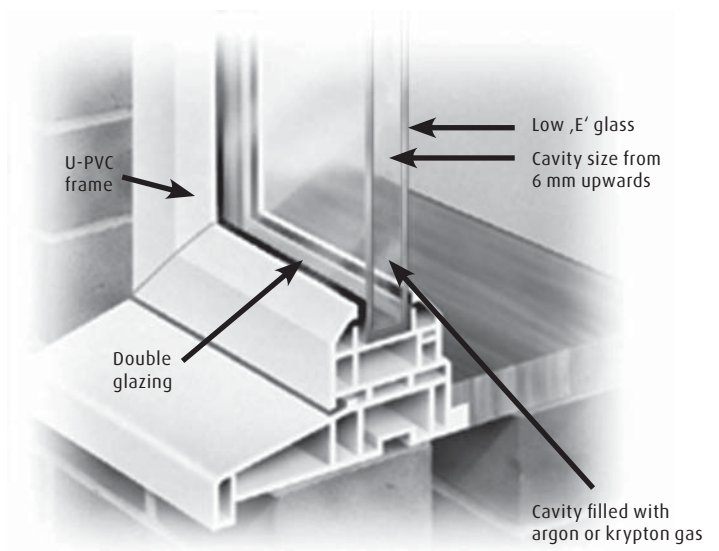
UK legislation overview

Building regulations

Building Regulations Part L, Conservation of fuel & power applies in England & Wales and forms part of the government's overall strategy to reduce energy usage and CO₂ emissions. Revised legislation will become effective from 1st October with transitional arrangements in place to 1st April 2011 (for contracts signed before 1st October 2010).

In Scotland, a set of Technical Handbooks is published by the Scottish Building Standards Agency. These provide guidance on how to comply with the Building (Scotland) Regulations 2004. Technical Handbook 6 (2009) deals with energy efficiency. Revisions to the legislation will become effective from 1st October 2010.

In Northern Ireland, the Department of Finance and Personnel publishes technical guidance for complying with the Building Regulations (Northern Ireland) 2000. Technical Booklet F includes guidance on energy efficiency matters.



Understanding the requirements

Guidance notes are supplied in the Approved Documents to the relevant Building Regulations. Window units must meet the minimum window energy efficiency. Current regulations for England and Wales* specify WER band "E", the revision will increase this to band C or above. The new equivalent U-value (whole of window) is specified in the table below as included in Approved Document L1B (domestic replacement and extensions).

	Fitting	Existing standard	2010 Revised standard
England & Wales	Window, roof window or rooflight	Minimum WER band E or centre pane U value of 1.2 W/m ² K	WER band C or better or whole of window U value 1.6 W/m ² K
	Doors with >50% of internal face glazed	U value 2.2 W/m ² K (whole of unit) or U value centre pane 1.2 W/m ² K	U value 1.8 W/m ² K
	Other doors	U value 3.0 W/m ² K (whole of unit)	U value 1.8 W/m ² K
Scotland	New and replacement windows, doors and rooflights	Area weighted average U value 1.6w/m ² /K or WER band D, with an individual element U value 3.3 W/m ² K maximum	Area weighted average U value 1.6w/m ² /K or WER band C, with an individual element U value 3.3 W/m ² K maximum
Northern Ireland	Window, roof window or rooflight	U value 2.0 W/m ² K, WER Band E or better or centre pane U value 1.2 W/m ² K	Consultation expected to begin from November 2010
	Doors with >50% of internal face glazed	U value 2.2 W/m ² K or centre pane 1.2 W/m ² K	Consultation expected to begin from November 2010
	Other doors	U value 3.0 W/m ² K	

*Alternative regulations and limits apply in Scotland and Northern Ireland.

Half of all CO₂ emissions come from buildings; about 30% from dwellings with 20% from commercial and other premises. Glazed units are a major contributor to overall building U value. Thermal imaging (as below) clearly shows heat loss from inefficient glazed units.

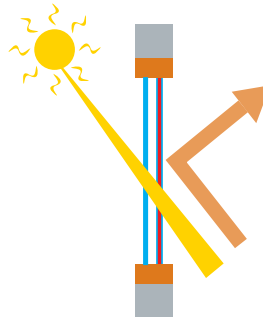


Figure 1. Solar gain.
Choice of glazing material affects solar gain, light passes through the glass with heat being reflected back inside.

Key factors affecting window energy efficiency

Sealed unit manufacturers have several options available to meet the minimum energy standard required under building regulations.

Manufacturers can use any combination of the following components to meet the regulatory standard.

Glazing materials

Low emissivity (low e) glass has a reflective surface to reflect heat back through the window. The low e coatings reflect between 40% to 70% of the heat that is normally transmitted through clear glass while allowing the full amount of light to pass through, see figure 1. This type of glass is now standard under the Building Regulations for most homes in the UK.

Number of glazing layers

Double or triple glazed windows have insulating air or gas-filled spaces between each pane. Each layer of glass and gas resists heat flow and thus increases insulation.

Insulating gas used between glazing layers

Filling the cavity with argon is a more efficient insulating gas than air. Other high performance insulating gases used in window manufacture are krypton or xenon or a mixture of these gases can provide the required level of insulation, i.e. for an "A" band window.

Sizing of cavity

The size of cavity gap is also important, spaces which are too wide allow too much heat transfer, resulting in reduced insulation.

Design, material and type of frame and other components.

Wood or UPVC frames have better insulating properties than metal frames, although any frame material can produce energy efficient windows if designed correctly.

Alternative spacer technology, i.e. a "warm edge" spacer is designed to reduce heat loss at the corners of the unit and improve its overall efficiency.

BOC offer

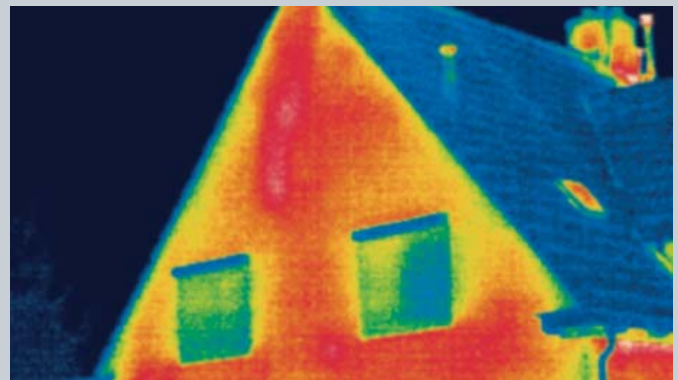
As the UK's largest gas supplier we can offer an unrivalled range of products to support the glazing industry, from insulating gases to personal protection equipment and workwear.

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Measurement of "U" value for buildings

- "U" value is rate of thermal transmittance of a material (W/m²K) – or simply heat loss!
- Glazed units are a major contribution to overall building U value, seen by use of thermal imaging
- Replacement and new build windows fall under this legislation
- Revised maximum elemental U value (England and Wales):
 - 1.6 W/m²K for PVC-U and timber framed windows, or WER band C
- Typical U value for single glazing = 4.8 W/m²K
- Scotland and Northern Ireland apply different legislative targets



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