Bulletin 11

Building (Scotland) Amendments Regulations 2010
Changes to Technical Handbooks - Section 6 (Energy) 2010
June 2010

In summary

The Scottish Government has released the new versions of the domestic and non-domestic Technical Handbooks in support of the Building (Scotland) Amendments Regulations 2010, coming into force on 1st October 2010. New buildings will have to be at least 30% more efficient than current new buildings.

For replacement windows, the requirements for Window Energy Ratings and window U-values have been tightened. Severe restrictions are placed on the centre pane U-value compliance route. The benefit of supplementing existing single glazing with secondary glazing has also been recognised. Energy efficient glazing such as Pilkington **K Glass**™ and Pilkington **energiKare**™ are well placed to satisfy these requirements.

For non-dwellings, there is a greater focus on limiting solar gains in the summer, increasing opportunities for high performance solar control glass such as Pilkington **Suncool**™, Pilkington **Eclipse Advantage**™ and Pilkington **Solar-E**™. This Bulletin summarises the changes which are relevant to glazing. They come into force on 1st October 2010.

Introduction

On 6th April 2010, the Scottish Government released the new versions of the domestic and non-domestic Technical Handbooks in support of the Building (Scotland) Amendments Regulations 2010. They will come into effect on 1st October 2010. The amendments have been made against the background of the Sullivan report, which outlined a low carbon building standards strategy for Scotland. It recommended improvements in energy efficiency in 2010 and 2013 with a target of zero carbon new buildings by 2016 or 2017. This Bulletin summarises the parts of the new Technical Handbooks that are directly relevant to the energy performance of glazing.

Headlines

- Significant reductions in target carbon dioxide (CO_2) emissions for all new buildings (compared with 2007)
- Requirements for Window Energy Ratings and window U-values have been tightened for replacement windows for dwellings
- Severe restrictions are placed on the use of centre pane U-values
- More conservatories fall in the scope for low emissivity (low-e) glass
- Higher standards for windows for extensions where the fabric of the existing dwelling is poor
- Increased focus on limiting solar gains during the summer, in non-dwellings

New dwellings

The CO_2 emissions associated with the energy consumption of the whole dwelling remains as the sole criterion for demonstrating compliance, in that the predicted rate of emissions from the dwelling (the Dwelling Emissions Rate) must not be greater than the Target Emissions Rate (based on a notional dwelling). The standard government software, SAP, provides the means for determining compliance. For 2010, an aggregate target 30% reduction in CO_2 emissions (compared with the 2007 standard) has been set.

However, this does not mean every component of a building will have to improve by 30%. As for 2007, there are no specific elemental requirements for windows other than 'long stops'. The long stop, or limiting value, for the U-value for windows, doors and rooflights has been set at 1.8 W/m^{2}K. No restrictions have been placed on glazed areas, offering the designer flexibility to take advantage of energy saving glass. As an alternative, particularly aimed at the self-build sector, the dwelling can be designed to the same elemental values as for the notional dwelling and effectively considered 'deemed-to-satisfy'. In the notional dwelling, a window U-value of 1.5 W/m^{2}K and 4.4m^2 of solar thermal panels have been assumed.

Implications for glazing:

As the Government's software fully takes into account solar gains, Pilkington **K Glass**™ with its high g-value will generally result in a dwelling having a similar emissions rate to one with soft coat low-e glass.

Adding low iron glass, such as Pilkington **Optiwhite**™, increases the g-value of the glazing even further and improves the Dwelling Emission Rate.

The limiting window U-value of 1.8 means that low-e double glazing remains the minimum. Although not a requirement, triple glazing such as Pilkington **energiKare**™ Triple may become increasingly more common in new dwellings as demonstrated by its prevalence in low energy houses.

Existing dwellings

In existing dwellings, replacement windows and windows for conversions remain within the scope of the Building Regulations.
The requirements apply to whole windows, roof windows, rooflights and doors (including the frame). Applications where only the glass is being replaced in the existing frame are outside of the scope. The standards in existing buildings, where the windows are being created or replaced or installed into conversions of heated buildings, are summarised in Table 1.

Table 1. Maximum requirements for replacement windows for existing dwellings

Element	Standard
Window, door or rooflight	Window Energy Rating (WER) = band C (or better) or whole U-value = 1.6 W/m^{2}K

Where only 1 or 2 windows are being replaced, to allow matching windows to be installed, the frame may be disregarded for assessment purposes, provided the centre pane U-value is 1.2 W/m^{2}K or less. For secondary glazing, an existing window after alteration should achieve a U-value of 3.5 W/m^{2}K. Trade off between building elements is possible via a compensatory approach where the total area of windows, doors and rooflights exceeds 25% of the floor area.

For extensions and conversions of unheated dwellings, the requirements will depend upon the level of fabric insulation in the existing dwelling. The requirements for windows are summarised in Table 2.

Table 2. Maximum performance requirements for windows, doors and rooflights in extensions

	Window Energy Rating (WER)	Window U-value (average-weighted)
Where U-values for wall and roof of existing building are poorer than 0.7 and 0.25 W/m^{2}K, respectively[1]	A	1.4
Otherwise	C	1.6

[1] This level is broadly equivalent to pre-1983 regulatory requirements

Sometimes referred to as 'consequential improvements', this requirement means that the builder has two options when adding an extension to a poorly-insulating dwelling:

- Improve the fabric insulation of the existing dwelling and then build the extension to the current energy efficiency requirements, or
- Retain the existing building as it is, but build the extension to a higher performance level than required.

Using a compensatory approach, it is possible to vary the U-values of the elements of the fabric, as long as the overall U-value of the extension is no greater than that of the 'notional' extension.

Implications for glazing:

Although Window Energy Ratings are not the sole measure for replacement windows and windows for extensions, there is no doubt that the demand for windows to be energy rated is increasing. As a minimum rating of band C is required, this acknowledges the positive contribution that energy efficient windows can make in delivering CO_2 and energy savings for dwellings. Energy efficient windows, such as those containing Pilkington **energiKare**™ with its high g-value, will continue to meet and exceed the requirements, with options available to achieve an A rating. Due to its hard and durable coating, Pilkington **K Glass**™ is the ideal choice for secondary glazing.

Conservatories

The cut-off between small and larger conservatories has been removed, meaning that the energy efficiency requirements now apply to all conservatories with a floor area of 8 m^2 and greater. The glazed elements (i.e. glass + frame) should have a U-value not

exceeding 2.0 W/m²K. This is provided that there is an appropriate thermal separation between the conservatory and dwelling.

Implications for glazing:
Most conservatories will now be subject to the energy efficiency requirements, so low-e glass becomes standard in such applications which Pilkington **K Glass**™ will meet.

Furthermore, although not a requirement, the addition of Pilkington **Activ**™ Blue and Pilkington **Activ**™ Neutral will help to deliver energy savings and comfort benefits to the consumer and allow year round use.

New buildings other than dwellings

As for dwellings, the only means of achieving compliance is on the basis of total CO_2 emissions of the building, using the government-approved software SBEM.
A target of a 30% (aggregate) reduction in CO_2 emissions across all new non-dwellings (c.f. 2007) has been set. There are no specific elemental requirements for windows, other than 'long stops'. The long stops, or limiting values, for windows, doors and rooflights is 2.0 W/m²K. There are no limits for ground floor display windows and similar glazing. For calculating the target CO_2 emissions level, the notional building is assumed to have a window U-value of 2.2 W/m²K and glazing g value of 0.65, with glazed areas as detailed in Table 3.

Table 3. Areas of windows, doors and rooflights in the notional building

Building type	Windows and personnel doors as % of exposed wall	Rooflights as % of roof
Residential (non-domestic)	30	0
Offices, shops and buildings for entertainment and assembly purposes	40	0
Industrial and storage	15	10

Implications for glazing:
The heat loss, solar gain and daylight transmission of glazing is taken into account by SBEM. As the significance of each factor will vary according to the design and type of building, and whether it is air-conditioned or naturally ventilated, it is not possible to draw overall conclusions about the impact on glazing. The limiting value does, however, mean that non low-e glass is not allowed.

Existing buildings other than dwellings

The standards for windows for existing buildings other than dwellings are summarised in Table 4.

Table 4. Standards for extensions, replacements and conversions of existing buildings other than dwellings

Element	Standard
Window, door or rooflight[1]	U-value = 1.6 W/m²K

[1] excluding display windows

There is no option for using Window Energy Ratings to demonstrate compliance for non-dwellings that are domestic-like in use, e.g. student accommodation, care homes, etc.

Where only 1 or 2 windows are being replaced, to allow matching windows to be installed, the frame may be disregarded for assessment purposes, provided the centre pane U-value is 1.2 W/m²K or less. For secondary glazing, an existing window after alteration should achieve a U-value of 3.5 W/m²K. For extensions, trade off between building elements is possible via a compensatory approach where the total area of windows, doors and rooflights exceeds 25% of the floor area.

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The Scottish Government has released the new versions of the domestic and non-domestic Technical Handbooks in support of the Building (Scotland) Amendments Regulations 2010, coming into force on 1st October 2010. New buildings will have to be at least 30% more efficient than current new buildings.

For replacement windows, the requirements for Window Energy Ratings and window U-values have been tightened. Severe restrictions are placed on the centre pane U-value compliance route. The benefit of supplementing existing single glazing with secondary glazing has also been recognised. Energy efficient glazing such as Pilkington **K Glass**™ and Pilkington **energiKare**™ are well placed to satisfy these requirements.

For non-dwellings, there is a greater focus on limiting solar gains in the summer, increasing opportunities for high performance solar control glass such as Pilkington **Suncool**™, Pilkington **Eclipse Advantage**™ and Pilkington **Solar-E**™. This Bulletin summarises the changes which are relevant to glazing. They come into force on 1st October 2010.

Limiting the effects of solar gains in summer

There is a greater focus on ensuring that the building has appropriate passive solar control, thus limiting the effects of solar gain in the summer. Designers are encouraged to consider natural ventilation strategies and pay particular attention to limiting solar gains by ensuring appropriate solar control measures are in place. The Building Emission Rate can be adjusted to give credit if a naturally ventilated building design can achieve an occupied period temperature of less than 28°C. This recognition complements an independent study[1] undertaken to quantify the potential energy and CO_2 savings from the greater use of solar control glass in the EU, including the UK.

[1] 'Impact of Solar Control Glazing on energy and CO_2 savings in Europe' (TNO Report 034-DTM-2009-01988B)

Implications for glazing:

For extensions to non-dwellings, U-values for windows, doors and rooflights have been tightened up. Severe restrictions have been placed on the use of centre pane U-value as a compliance route. There is recognition of the benefits of secondary glazing, for which Pilkington **K Glass**™ is ideally suited.

The greater focus on limiting solar gains in the summer through passive control measures, particularly in non-dwellings, will result in an increased use of high performance solar control glass, such as Pilkington **Suncool**™, Pilkington **Eclipse Advantage**™ and Pilkington **Solar E**™.

Historic and traditional buildings

Although work on most existing buildings will need to comply with the energy efficiency requirements, special considerations may apply to some historical and traditional buildings, particularly in arriving at an appropriate balance between heritage and energy conservation.

Implications for glazing:

An appropriate balance may be possible to achieve using products that can replace energy inefficient single glazing in older traditional buildings whilst retaining the original frames. Utilising advanced Pilkington **Spacia**™ vacuum glazing technology, Pilkington **energiKare**™ Legacy has the same thickness as single glazing but with four times better thermal insulation.

Timescale

The requirements will be implemented on 1st October 2010.

More information

For more information on the changes to energy efficiency requirements in Scotland, or our range of products, please contact our Technical Advisory Service (email us at pilkington@respond.uk.com or phone on 01744 692000).

To see the document in full go to www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards/publications/pubtech

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