

Bulletin 5



Building Standards (Scotland) Regulations: Relaxation of Technical Standard J3.2

In Summary

The new Part J prescribes different U values for windows of dwellings, depending on the efficiency and fuel of the heating system. A Class Relaxation has however been issued by the Scottish Executive, which means that – irrespective of the heating system – the least onerous U values will apply in replacement windows until 1st March 2003. After that, PVC-U or timber replacement windows installed in dwellings having the more inefficient heating systems will need to have a U value of 1.8. This is a U value which Pilkington K Glass™, in an argon-filled unit, will help to achieve.

This is the fifth in a series of Bulletins designed to keep you informed about changes to Building Regulations for the Conservation of Fuel and Power, in both Scotland and England & Wales. Unlike the previous Bulletins however, this one deals with a relaxation in the Regulations.

The new Part J

Bulletin 3 described the new Building Standards (Scotland) Regulations Part J, which came into effect on 4 March 2002. This sets down tougher U values for windows in new dwellings and those being replaced in existing dwellings. The required U value listed is dependent on the frame material and the heating system, as shown in table 1.

Table 1. Required window U values for dwellings

Maximum U value (W/m ² K) for windows, doors and rooflights (overall average)		
Frame type	With gas or oil central heating having an efficient boiler*	With electric heating, solid fuel central heating, or gas or oil central heating having an inefficient* boiler
PVC-U or timber windows	2.0	1.8
Aluminium or steel windows	2.2	2.0

* boiler efficiency is classified by its SEDBUK rating; a table in Part J shows the values which define whether a boiler is "efficient" or not.

In new dwellings, the designer or builder can specify the heating system and therefore has some control over what the window U values should be. This choice is not available when replacement windows are installed in existing dwellings. Even more of a constraint is the fact that the window installer or occupier is unlikely to know the SEDBUK efficiency of an existing gas or oil boiler, and it would therefore be impossible to determine which maximum U value should apply to the replacement windows.

A temporary relaxation

Fortunately the Scottish Executive has issued Class Relaxation 140, which applies to the U value requirements for windows "being replaced in existing dwellings or installed in alterations or extensions to existing dwellings". The effect of this Class Relaxation is that, irrespective of the heating system, the least onerous U values in table 1 will be acceptable. In other words, the U value requirement for replacement windows is 2.0 W/m²K for PVC-U or timber windows, and 2.2 for metal.

Class Relaxation 140 however applies only until 1 March 2003. After that, replacement windows in dwellings with the less efficient gas or oil boilers, or electric and solid fuel heating, will have to be to the tougher U values of 1.8 (PVC-U or timber) and 2.0 (metal). Whenever - as is likely - the performance of the heating system is unknown, it is assumed the window installer will be required to meet these more stringent U values.

Meeting the longer term requirements

From March 2003 therefore many - perhaps the majority - of replacement windows will need to achieve a U value of 1.8. And of course, as the relaxation does not apply to new build, a U value of 1.8 is today's requirement for PVC-U and timber windows in dwellings having the less efficient heating systems (see the final column of table 1). So how can U1.8 be achieved and demonstrated?

1. Hot Box

The most authoritative way of demonstrating U value is by a test certificate, showing the results of Hot Box measurements to BS EN ISO 12567-1:2000. We are aware of tests having been conducted on commercially available PVC-U windows, incorporating double glazed units comprising Pilkington K Glass™ and 16mm argon filling, which show U values lower (ie better) than 1.8 W/m²K.

2. Calculation

Secondly, the window U value can be calculated according to BS EN ISO 10077-1:2000. This enables the U value to be obtained from the frame U value, the glass centre-of-pane U value (U_g) and the window configuration. Tables 2 and 3 give calculated window U values, based on a 1m² window with 30% frame area (ie: the window which forms the basis of the figures in the tables of indicative U values in Part J).

Table 2. Window U values with Pilkington K Glass™

Frame U value U_f (W/m ² K)	Pilkington K Glass™ with			
	12mm air	16mm air	12mm argon	16mm argon
	$U_g = 1.9$	$U_g = 1.7$	$U_g = 1.6$	$U_g = 1.5$
1.5	2.0	1.8	1.8	1.7
1.6	2.0	1.9	1.8	1.7
1.7	2.0	1.9	1.8	1.8
1.8	2.1	1.9	1.9	1.8
1.9	2.1	2.0	1.9	1.8
2.0	2.1	2.0	1.9	1.9

Table 3. Window U values with Pilkington Optitherm™ . SN

Frame U value U_f (W/m ² K)	Pilkington K Glass™ with			
	12mm air	16mm air	12mm argon	16mm argon
	$U_g = 1.6$	$U_g = 1.4$	$U_g = 1.3$	$U_g = 1.3$
1.5	1.8	1.6	1.6	1.5
1.6	1.8	1.7	1.6	1.5
1.7	1.8	1.7	1.6	1.6
1.8	1.9	1.7	1.7	1.6
1.9	1.9	1.8	1.7	1.6
2.0	1.9	1.8	1.7	1.6

Tables 2 and 3 are based on double glazed units incorporating 4mm glass, with Pilkington Optifloat™ Clear in the outer pane, and for gas filled units having 90% argon, 10% air.

Table 2 shows that the required U1.8 can be achieved with a double glazed unit incorporating 4mm Pilkington K Glass™ and 16mm argon when the U value of the frame is 1.9 or better, or with a 12mm argon-filled cavity when the frame U value is 1.7 or better. For any given window, the appropriate frame U value to use in the table should be obtained from the window manufacturer or system supplier.

3. Indicative U values

A final, but the least accurate, alternative is to read off the window U value for the relevant configuration in the appropriate table in Appendix A of the Part J Document. A disadvantage is the limited number of options it presents, particularly the range of glass emissivities.

Table 2 shows that the 1.8 U value, which will inevitably become more in demand after March 2003 when Class Relaxation 140 terminates, can be achieved by a window comprising a frame of reasonable thermal performance and a double glazed unit incorporating argon and Pilkington K Glass™.

Calculation of window U value to BS EN ISO 10077-1:2000, or reading off U value from Appendix A of the Part J Document, requires the glass emissivity to be known. Table 4 gives the emissivities of products in the Pilkington range.

Table 4. Emissivities of Pilkington low E glass range.

Product	Emissivity ϵ_n
Pilkington Optitherm™	0.15
Pilkington Optitherm™	0.09
Pilkington Optitherm™ SN	0.04
Pilkington Optitherm™ S2	0.02

The longer term (post Class Relaxation 140) requirements of Part J, can be achieved with any product in the Pilkington low E glass range, when it is incorporated in the appropriate double glazed unit and in combination with a frame of suitable thermal performance.

For more information and details of the Pilkington range of low emissivity glass, or for assistance in obtaining U values to demonstrate compliance with Part J, contact

Pilkington Technical Helpline
Tel 00 44 1744 69 2000

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For more detailed background and information visit our website: www.pilkington.com and see the New Building Regulations section on the building products UK homepage. This includes summaries of manufacturers' Hot Box test reports on windows whose U values have been shown to meet or exceed the new Part J requirements.



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