

Bulletin



March 2005

Window Energy Ratings 2

In Summary

Window Energy Ratings have arrived. They are an integral part of proposed changes to Building Regulations and government supported schemes for promoting energy-efficient products.

For the first time they offer the fenestration industry a means of promoting their best products to the consumer, in terms that the consumer understands and recognises.

And, because Ratings take into account the positive energy gains through glazing, they will help windows defend their position against their biggest competitor - the brick wall!

This Bulletin updates the progress of BFRC Ratings since their launch a year ago. We explain how you go about getting a Rating, and we talk about the important factors that affect a window's Rating. And we suggest some of the technologies which can help a window achieve a better Rating, right up to an A!

Window Energy Ratings are the topic of the moment. Since the British Fenestration Rating Council (BFRC) launched the scheme last year, BFRC Ratings have been recognised in a number of government-supported initiatives, and window companies are starting to get their products rated and labelled. The pace of development has been rapid, so we thought it appropriate to issue a second Bulletin on Window Energy Ratings to keep you abreast of progress and issues in this important area.

The story so far

Window Energy Ratings were launched in March 2004 by the British Fenestration Rating Council (BFRC), an independent government-supported body established to develop and administer a system of Window Energy Ratings in the UK. Full details of the organisation, and how a window company can have its products rated, are given on the website www.bfrc.org.

A window's Rating is determined by a formula which takes into account its total solar heat transmittance (usually referred to as g value), U value and air infiltration. The resulting value is then placed into a band on an A-G scale. This makes the system of rating windows consistent with other products which have energy performance labels (such as washing machines, light bulbs and fridges), and with which the public is very familiar.

In July 2004 the Office of the Deputy Prime Minister (ODPM) issued proposals for revisions to Part L of the Building Regulations in England and Wales. These included a recommendation that Window Energy Ratings should become a method of demonstrating compliance with Part L; the minimum level for replacement windows being -40kWh/m²/yr (which is in band E). In November 2004 proposals for revisions to the equivalent part of the Building Regulations of Northern Ireland were issued, again including a recommendation that Window Energy Ratings should become a compliance criterion.

Also in November, BFRC Ratings became recognised under the Energy Efficiency Commitment (EEC). The EEC is the obligation on the electricity and gas supply companies to achieve energy savings in households. The companies must encourage and assist their customers to install energy saving measures, through subsidies or other means. Up to now, windows have never been listed by government as one of the measures, but in the most recent list of EEC measures published by DEFRA on their website, windows with a rating of band C are included. And most recently, the Energy Saving Trust's scheme "Energy Efficiency Recommended", which endorses the best performing products in a category, has been extended to windows; those having band C or better will receive the EER endorsement.

Who gets a BFRC Rating?

A BFRC Rating and label apply to a whole window (i.e. frame and glass). They do not apply to either the frame or the system or the glass individually. Therefore it is at the point at which all these components come together to produce a whole window that the Rating and label are obtained. Usually it would therefore be the window installer's product which is rated/labelled, although in the case of a factory-glazed window it could be the window manufacturer's product.

Obtaining a BFRC Rating and label involves three stages:

1. A BFRC Certified Simulator produces an assessment report* of the window.
2. A BFRC Independent Agency ensures the window company has a satisfactory quality management system, approves the Certified Simulator's report and informs BFRC.
3. BFRC authorise, and inform the window company of, the product's Rating and give permission to them to use labels. BFRC place the product on the database on its website.

* The Certified Simulator's report gives an assessment of the BFRC Rating, which takes into account U value, g value and L value (air leakage). The U value would normally be produced by the Simulator using approved software, the g value comes from the glass manufacturer and the L value from testing to BS 6375. The U value simulation is performed for a window to the standard GGF configuration, and the result can be applied to all products of other configurations using the same system/profile.

Although a window system or frame in itself cannot gain a BFRC Rating, it would probably be in a system/window company's interests to have an assessment report done for a window using his profile, and incorporating a standard IGU. A BFRC Certified Simulator would probably charge about £800 for this. This could be repeated using different IGU variants in the same window at about £60 per variant. The benefit to the systems supplier is that the one report could then be used by his customers as part of their evaluation by a BFRC Independent Agency.

Implications of Window Energy Ratings on glass specification

BFRC Ratings take into account both the positive (solar gain) and negative (heat loss) aspects of the glass. With low E glass, hard coat products have a greater heat loss but a higher solar gain than soft coat products. The overall BFRC Rating of a window is dependent on much more than these two factors (for example frame area, frame U value and airtightness), but in general we have found that any given window will be rated in the same category, irrespective of whether it contains Pilkington K Glass™ (hard coat) or Pilkington Optitherm™ SN (soft coat). This is because the increased heat loss of a window containing Pilkington K Glass™ is balanced by its improved solar gain (see table).

How to get an improved BFRC Rating

So, if the type of low E glass is not an important variable, what factors do bring about significant changes in the Rating? Basically, what is needed are options which either improve the IGU's U value without reducing its g value, or which improve the g value without compromising U value. Using argon in the cavity and/or warm edge spacers will improve U value, using a low iron glass such as Pilkington Optiwhite™ will improve g value. The magnitude of the benefits will depend on non-glass factors such as the frame U value and percentage frame factor; the table gives BFRC Ratings for two PVC-U windows, to GGF standard configuration, containing a range of IGU options. In these examples, Window 1 has a frame U value of 1.8, the frame factor is 20% and the heat loss rate due to air leakage is 0.03 W/m²/K. Window 2 has a frame U value of 1.9, a frame factor of 25% and air leakage 0.03. The results show that the frame has an important influence on the Rating but, by combining the best available technologies, it should be possible to achieve an A-rated window.

IGU configuration	g value*		U value (W/m ² K)		Window Energy Rating (kWh/m ² /y)		WER band	
	Window 1	Window 2	Window 1	Window 2	Window 1	Window 2	Window 1	Window 2
4 Pilkington Optifloat™ clear/16 air/4 Pilkington K Glass™	0.58	0.54	1.97	1.99	-23.7	-32.1	D	E
4 Pilkington Optifloat™ clear/16 air/4 Pilkington Optitherm™SN	0.50	0.47	1.73	1.77	-21.4	-30.3	D	E
4 Pilkington Optifloat™ clear/16 argon/4 Pilkington K Glass™	0.58	0.54	1.81	1.84	-12.7	-21.9	C	D
4 Pilkington Optifloat™ clear/16 argon/4 Pilkington Optitherm™SN	0.50	0.47	1.57	1.62	-10.4	-20.1	C	D
4 Pilkington Optiwhite™/16 argon+warm-edge/4 Pilkington K Glass™	0.62	0.58	1.73	1.76	+0.6	-9.0	A	B
4 Pilkington Optiwhite™/16 argon+warm-edge/4 Pilkington Optitherm™SN	0.54	0.50	1.49	1.54	+1.3	-8.7	A	B

* the g values listed here apply to solar radiation perpendicular to the glass; in the BFRC Rating equation they are then multiplied by 0.9 to allow for all angles of incidence.

The benefits of Ratings to the fenestration industry

For too long, in the context of energy conservation, glazing has been regarded by specifiers and legislators as the weak point in the building envelope. And no matter how low window U values become, they will never approach those of the walls. That is why the response of housebuilders to successive Building Regulations changes based purely on tighter U values has been to reduce window size.

Now, with Window Energy Ratings, we have a system which recognises the positive energy gains through windows. This will change mind-sets; windows will be acknowledged as energy contributors, and hopefully legislators and specifiers will stop thinking in terms of reducing window areas.

The A-G rating system provides a means of promoting the industry's most energy-efficient products to the householder. It also gives the government and their agencies a yardstick enabling them to introduce incentives to increase the uptake of energy-efficient windows, and will allow windows to be covered by the same sort of support schemes enjoyed by other products in the past. The rapid incorporation of windows into the EEC and EER schemes is an early example of these opportunities.

Hopefully, all parts of the fenestration industry will recognise the successful start for Window Energy Ratings, and will look for ways to capitalise on the opportunities they present to promote the benefits of the industry's products.



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