Bulletin

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Window Energy Ratings

In Summary

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Window Energy Ratings take other factors (ie solar heat gain and ventilation losses) into account, and blend them together to produce a rating which more accurately and fairly reflects the energy performance of a window in a typical house.

The system has recently been launched in Britain by the British Fenestration Rating Council (BFRC). This Bulletin is intended to give you a brief introduction to BFRC Ratings, what they are likely to mean for you, and how to get more detailed information if you want to have your windows rated.

A brand new way of assessing the energy performance of domestic windows has been developed by the British Fenestration Rating Council (BFRC), an independent, government-backed body. This system provides a more accurate way of assessing the impact of a window on the energy performance of a house than does the simple U value. The system was launched at Glassex in March. It could well be brought into the next revision of Building Regulations Part L. We are therefore likely to see a quick growth in the awareness and use of BFRC Ratings; this Bulletin is intended to introduce you fully to the system, and its implications.

What is a "BFRC Rating"?

The BFRC Rating combines the three key factors which affect a window's energy performance - conduction heat loss (U value), solar heat gain (g) and heat loss through air infiltration (L) - into a single performance number. The three factors are linked by an equation, which produces the BFRC Rating:

$$\text{BFRC Rating} = (218.6 \times g) - 68.5(U \text{ value} + L)$$

The unit of the rating is kilowatt-hours per square metre per year. BFRC developed the equation so that, in a typical UK house of average orientation, the value of the rating represents the net useful energy flow across the window throughout the year. If the rating value is positive, it means that the window is likely to be a net contributor of energy over the year.

The solar heat gain (g) value used in the equation is for the whole window, not just the glass. Therefore a window with slim frames will have a higher g-value than one with wider frame sections. Similarly, the U value used in the equation is that for the whole window. The value of L is the air leakage rate under average conditions.

BFRC (The British Fenestration Rating Council) has a website, www.bfrc.org that contains several Information Sheets which give more technical detail on the components in the BFRC Rating, how it is calculated and how a rating is obtained.

For consumer purposes, the BFRC Rating value can be converted to a rating on an A to G scale. This is the same scale that is used to rate the energy performance of other domestic goods, such as fridges, washing machines and light bulbs. The public are already familiar with this type of rating and label, and instantly understand that "A-rated goods are energy-efficient and G-rated ones aren't." Table 1 shows the relationship between a BFRC Rating's numerical value and its A to G rating.

Table 1: BFRC Ratings.

BFRC Ratings	
kWh/m²/year	**A – G scale**
≥0	A
-10 to <0	B
-20 to <-10	C
-30 to <-20	D
-50 to <-30	E
-70 to <-50	F
<-70	G

A launch leaflet has been prepared jointly by the BFRC and the Energy Saving Trust, and was issued at Glassex 2004. It is enclosed with this Bulletin. The leaflet shows what the label looks like, and gives more background.

Why have Window Energy Ratings been developed?

The concept has been developed because it was recognised that U values are an incomplete reflection of the impact which windows have on the energy performance of dwellings. Indeed, it was becoming recognised that lower U values (ie "better" U values) could be counter-productive if a coated glass sacrificed valuable solar gain as a result. Taking account of this solar gain (and the ventilation losses) results in a more technically correct, and a much fairer, method.

But doesn't this just make life more complicated?

From a manufacturer's point of view, clearly more factors will have to be taken into account than just the U value. However, the BFRC Rating system presents the window manufacturer with a greater number of options for improving the energy performance of the product. He/she will not be restricted to looking simply at U values. But from the specifier's viewpoint there will still be only one number to deal with (the BFRC Rating). And because this can be converted to an A to G rating, it will be much more consumer friendly and understandable to the public.

What are the implications for low E products?

Hard coat low E products such as Pilkington **K Glass**™ have a significantly higher solar heat transmittance than soft coat low E. The BFRC Rating system will therefore "reward" this positive benefit of hard coat. To put this into perspective, table 2 gives the ratings for a typical PVC-U window designed to GGF Data Sheet 2.2 configuration, incorporating four alternative 4/16/4 double glazed units (DGUs) - two containing Pilkington **K Glass**™ and two containing Pilkington **Optitherm**™ SN. You can see that, with this particular window, which has a 75:25 glass:frame area ratio and frame U value of 2.1, similar BFRC Rating values are achieved irrespective of the glass. BFRC Ratings for windows with other manufacturers' equivalent products would be the same as in the table.

Table 2: BFRC Ratings for a typical PVC-U window containing various DGUs.

DGU Specification	U value (whole window)	g value (whole window)	BFRC Rating (kWh/m²/yr)	Energy Label category
4/16air/4Pilkington **K Glass**™ (hard coat)	**1.9**	**0.54**	**-22**	**D**
4/16air/4Pilkington **Optitherm**™ SN (soft coat)	**1.7**	**0.47**	**-21**	**D**
4/16argon/4Pilkington **K Glass**™ (hard coat)	**1.8**	**0.54**	**-11**	**C**
4/16argon/4Pilkington **Optitherm**™ SN (soft coat)	**1.5**	**0.47**	**-11**	**C**

What is the immediate future for Window Energy Ratings?

The government, and official organisations such as the Energy Saving Trust, are strongly in favour of Window Energy Ratings, so we can expect to see BFRC Ratings being promoted and window companies being encouraged to adopt them. If they are incorporated into the next Building Regulations Part L revision - for example requiring replacement windows to be in category E, as an alternative to a U value of 2.0 - this will put ratings firmly on the map.

The fact that windows will be rated on the familiar A to G scale will open up the opportunity for government support (financial or otherwise) to householders for the purchase of windows in the higher categories - just as they have done to support the uptake of the more energy-efficient domestic appliances which are already labelled. These developments would however be longer term.

Who is authorised to issue the ratings?

The entire process takes place under the auspices of the British Fenestration Rating Council. The BFRC has a network of approved consultancies and companies, who are authorised to assess a window and calculate its rating. These are known as "Certified Simulators." The Simulator then submits all the information to the BFRC, who issue the certificate, which shows a window's BFRC Rating value, and its position on the A to G scale. Visit www.bfrc.org to see the current list of Simulators, and for more information on the entire process for getting windows certificated and labelled.

What does it mean for you?

Primarily, it will give you a tool for promoting more energy efficient windows, particularly to consumers who for the first time will have a simple way of comparing products. And it will give you a range of options for improving product performance. Ways in which a window's BFRC Rating can be enhanced are listed in the "Technology Toolkit" Information Sheet, which can be downloaded from www.bfrc.org. It is interesting to see that soft coat glass is regarded as achieving no improvement in the BFRC Rating, compared to hard coat.

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For more detailed information visit the BFRC website: www.bfrc.org

For more detailed background and information visit our website: **www.pilkington.com**

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