



BFRC ENERGY RATING – THE REHAU ABC

ENERGY EFFICIENT WINDOWS AND DOORS

INTRODUCTION

IMPROVING THE ENERGY EFFICIENCY OF WINDOWS AND DOORS

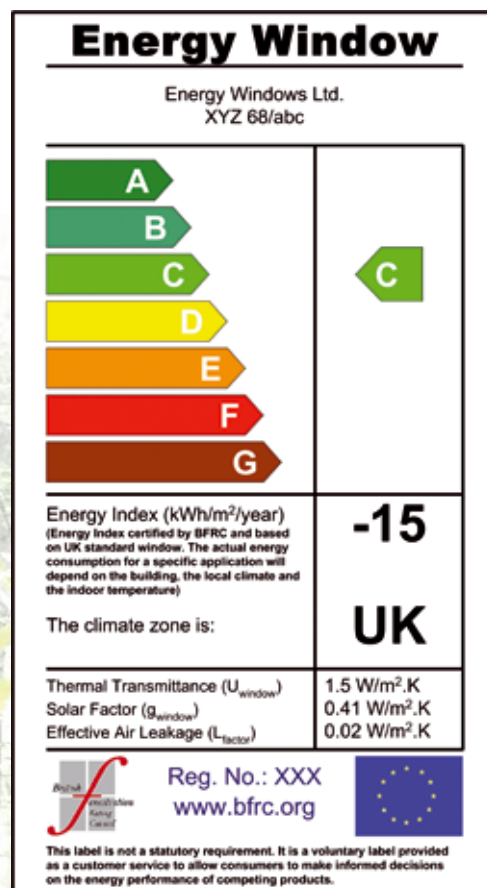
This information was put together in order to provide some background information to the BFRC Energy Rating, how to get your windows rated and which ratings are achievable with REHAU window systems. Further information is given on the web site www.bfrc.org

Background

Buildings are one of the major users of energy and one of the main areas of energy losses in any building is via the glazing. Improving the energy efficiency of windows and doors gives large improvements in the energy efficiency of buildings. Windows are in place for a long time and efficiency gains achieved by fitting high performance windows are effective for the life of the product. This will significantly reduce fuel bills, improve comfort and reduce greenhouse gas emissions for the life of the window installation.

The UK government has committed itself to huge reductions in CO₂ emissions within the Kyoto Agreement. This can only be achieved by significantly reducing the energy use of houses. Government, consumers and specifiers are focusing more and more on the energy efficiency of building products. Windows are one of the prime components of interest.

For consumer purpose, the BFRC Rating value is converted to a rating on an A to G scale, which is known to the public from white good products, like fridges or washing machines.



What is the Window Energy Rating?

The British Fenestration Rating Council (BFRC) is an independent, government-backed initiative set up to enhance the energy performance of buildings. BFRC in conjunction with the UK glazing industry and European partners has developed a Window Energy Rating to assess the energy performance of domestic windows.

Building Regulation

The BFRC Rating for windows is now included in the Building Regulation Part L with effect from April 2006. Beside the existing target U-Values for replacement windows, compliance to Part L can be shown using certain Window Energy Ratings. The standard for replacement windows in an existing dwelling should be an energy rating of 'E' or better and the standard for new windows in extensions should be a 'D' Rating or better. For new dwellings the compliance with Part L is proven via a Target CO₂ Emission Rate, which needs to be met, without specific BFRC requirements for the windows. For further information please refer to Building Regulation Part L.

Fittings	Standard for new fittings in extensions	Standard for replacement fittings in an existing dwelling
Window, roof window and rooflight	$U_w = 1.8 \text{ W/m}^2\text{K}$ or BFRC Rating = Band D or $U_g = 1.2 \text{ W/m}^2\text{K}$	$U_w = 2.0 \text{ W/m}^2\text{K}$ or BFRC Rating = Band E or $U_g = 1.2 \text{ W/m}^2\text{K}$

Energy Saving Trust

C rated windows or better are included in the Energy Saving Trust scheme "Energy Saving Recommended". The "Energy Saving Recommended" certification mark was developed by the Energy Saving Trust to distinguish the most energy efficient products on the market. Only products that meet the strict requirements will be endorsed and given the certification mark. Again this logo is widely known to the public. Further information is given on the web site: www.est.org.uk



Certification mark



BFRC RATING CALCULATION

HOW TO GET YOUR WINDOWS RATED

The BFRC has developed an equation to calculate the BFRC Rating. The value of the rating represents the net useful energy flow through the window throughout the year for a typical UK house. If the rating value is positive, it means that the window is likely to be a net contributor of energy over the year (A-Rating).

The unit of the rating is kilowatt-hours per square metre per year. 10 kWh/m²/a represent a heat loss of about 1 litre oil or 10 m³ gas per square metre window and year.

BFRC Rating Scale	BFRC Rating kWh/m ² /a
A	> 0
B	-10 to < 0
C	-20 to < -10
D	-30 to < -20
E	-50 to < -30
F	-70 to < -50
G	< -70

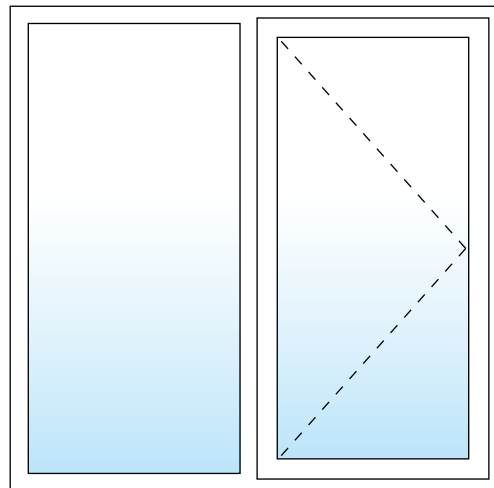
The rating combines the three key factors, which affects the window energy performance:

- Solar Gain (g-Value)
- Thermal Transmittance (U_w-Value)
- Air Leakage (L₅₀-Value)

The three factors are linked by the following equation:

$$\text{BFRC Rating} = 218.6 * g - 68.5 * (U_w + L_{50})$$

For consumer purposes the BFRC Rating value can be converted to a rating on an A to G scale.



The BFRC Rating is based on a standard Fixed beside Side Hung window (1230 mm wide x 1480 mm high).

The solar gain is the most important influencing factor within the BFRC Rating. In order to achieve the best ratings the g-Value of the glazing unit should be greater than 60%. Best performance would be achieved by the use of low iron glass. In parallel the visual glazing area should be maximised by using slim sight line profiles.

The thermal transmittance or U_w-Value of the overall window is calculated out of the U_g-Value of the glazing unit, the ψ-Value of the spacer bar and the U_f-Value of the window profile. To improve the U_g-Value, gas filling (Argon, Krypton) and low E coating (hard or soft coat) can be used. The ψ-Value can be improved by using warm edge spacer instead of Aluminium. And finally the U_f-Value of the profiles can be improved by using the patented REHAU Thermal Sleeves within the reinforcement chamber. REHAU Thermal Sleeves will improve the U_f-Value by up to 0.2 W/m²K.

The heat loss because of air leakage is calculated via the L_{50} -Factor. The air leakage at 50 Pa pressure difference can be taken from existing air leakage test reports carried out by UKAS approved test laboratories. Out of all three influencing factors (g -Value, U_w -Value, L_{50} -Factor) the L_{50} -Factor contributes the least to the BFRC Rating, but never the less needs to be considered.

Getting windows BFRC certified

Either the window fabricator or the installer can apply for BFRC approval as long as they supply both, frames and glazing units. They have to ensure via their quality management system that the purchased window achieves the performance as stated on the BFRC Certificate and must therefore control both frames and glass.

Independent Agencies

BM TRADA Certification Ltd

Chiltern House Stocking Lane
Hughenden Valley
High Wycombe HP14 4NR
Tel: 01494 569 700
Fax: 01494 565 487

Contact Simon Beer
Email: sbeer@bmtrada.com

BBA

British Board of Agrément
Bucknalls Lane Garston Watford
Herts WD25 9BA
Tel: 01923 665 348
Fax: 01923 665 301

Contact Chris Hunt
Email: chunt@bba.star.co.uk

BSI

BSI Product Service
Maylands Avenue Hemel Hempstead
Herts HP2 4SQ
Tel: 08450 765600
Fax: 01442 278516

Contact Kevin Frewin
Email: kevin.frewin@bsi-global.com

Build Check Ltd

Build Check Ltd Cressex Enterprise
Centre Lincoln Road
High Wycombe Bucks HP9 1HL
Tel: 01494 614624
Fax: 0870 2101013

Contact Sue Peatey or Richard Bate
Email: certification@buildcheck.co.uk

4 Easy Steps to Certification

In-house Preparation

- Decide which profiles and glazing combinations you would like to use
- Achievable ratings can easily be evaluated using the REHAU BFRC Quick Check software

BFRC Simulation

About £400 per certificate

- CAD Drawings of profiles and glazing combinations to be produced
- UKAS Approved Air leakage Test results for the chosen gaskets are required
- On the basis of existing REHAU simulation work, the chosen profiles and gasket combination is calculated

Audit By Independent Agency

About £1000 per certificate annually

- Choose from four Independent Agencies, BSI, BBA, BM TRADA or Build Check Ltd. Visit www.bfrc.org for most up to date list.
- Verification of your Quality Management System and Simulation Report

BFRC Certificate

About £50 per certificate annually

- BFRC will issue the certificate and lists the product on their web-site (www.bfrc.org)
- For C-rated windows or above the “Energy Saving Recommended” logo can be requested from the Energy Savings Trust www.est.org.uk

BENEFITS

IMPROVED MARKETING OPPORTUNITIES

There are significant marketing opportunities. The government, specifier and consumer are focusing more and more on energy efficient building products. By getting your windows BFRC certified you would be able to market the following benefits:

- Energy efficient windows will lead to reduced energy usage and cost to the end consumer, improve comfort and contribute to CO2 emission reductions.
- High performance will be clearly rewarded with higher ratings.
- Window energy rating will be a sales aid to provide differentiation between good and poor products.
- BFRC Logo is widely recognised by the end consumer, being used to ABC Ratings on white good products.
- It is easily understood by the end consumer, where as arguments regarding U Value are not.
- C rated products or better can be promoted with the certification mark “Energy Saving Recommended” from the Energy Saving Trust.
- C, B and even A rated windows can be achieved with REHAU window systems using the standard profile and reinforcement range.
- C Rated windows are based on standard double glazing units, offering the most cost effective solution, saving 60% on energy loss through windows in comparison to current Building Regulations for replacement windows.
- B Rated windows provide the best value for money with a 90% saving on energy loss in comparison to the average replacement window.
- A Rated windows are the best of the best. By definition they are a net contributor to the energy demand of the building, meaning that over the year A rated windows will contribute more solar gain than energy is lost via thermal transmission and air leakage through the window.

REHAU 70mm
Casement Window



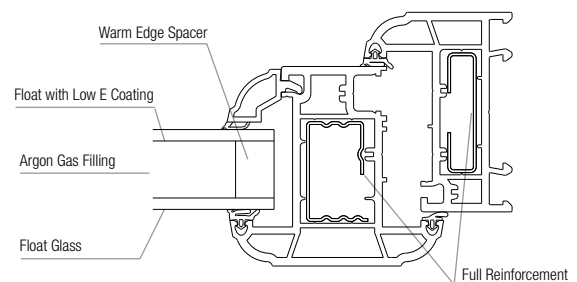
Achievable BFRC Ratings

The Solar Gain, the Thermal Transmittance and the Air Leakage influence the BFRC Rating. Because of this each profile and glazing unit combination needs to be simulated. In the following tables you can find general guidance on how to achieve an A, B and C rating with the REHAU Tritec, S706 and REHAU Edge Systems. It is to be noted that even an A Rating can be achieved using the standard profile and reinforcement range.

C Rating

C Rating can be achieved with the REHAU Tritec, REHAU S706 and REHAU Edge systems by using:

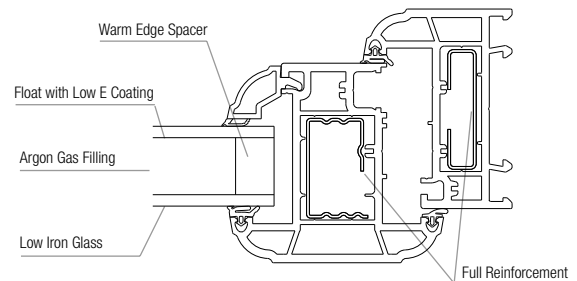
- Slim sight line profiles
- Standard or full reinforcement (to allow coloured options)
- Double glazing with Argon gas filling. Low E coating
- Warm edge spacer



B Rating

B rating can be achieved with the REHAU Tritec, REHAU S706 and REHAU Edge systems using the specification for the C rating and changing the outer pane to low iron glass.

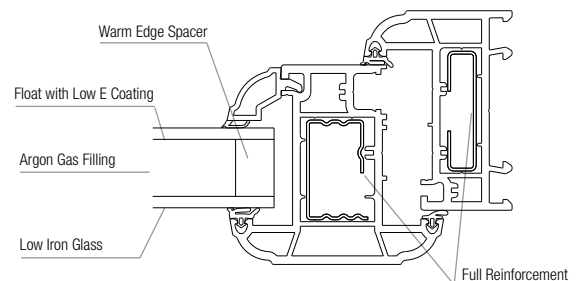
- Slim sight line profiles
- Standard or full reinforcement (to allow coloured options)
- Double glazing with low iron glass, Argon gas filling and low E coating
- Warm edge spacer



A Rating

A rating can be achieved with the S706 and REHAU Edge systems by using the specification for the B rating, however certain types of sealed unit and/or warm edge spacer bar may be required. For REHAU Tritec only standard reinforcement can be used

- Slim sight line profiles
- Standard or full reinforcement (to allow coloured options)
- Double glazing with low iron glass, Argon gas filling and low E coating
- Warm edge spacer



Instead of competing with the rest of the world about windows, which just comply with the Building Regulation, you can promote your windows by using the BFRC Energy Rating. C Rating, B Rating or even an A Rating is possible. So don't miss this marketing opportunity.

For further information please contact your regional REHAU sales office or visit the web site www.bfrc.org

Statement

In creating this information, REHAU offers its opinion on various matters and makes certain recommendations, after careful study of the Regulations and consultations with other bodies in the Window Industry.

This has been done in good faith to offer guidance for the benefit of our customers and the customers of our customers.

REHAU has taken every reasonable precaution to ensure the information contained is accurate.

However, REHAU will not be held liable if it has misinterpreted the Regulations in any way or if any of its opinions or recommendations are subsequently challenged. Companies relying on the information in this booklet do so at their own risk.

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