The Role of BFRC and FENSA in the UK

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FENSA
FENSA

- Fenestration Self Assessment Scheme
- When replacing fenestration products Homeowners must comply with all relevant Building Regulations
- Homeowner must obtain a certificate from a CPS or Local Authority Building Control
FENSA Members

- Must demonstrate **Minimum Technical Competence**: -
  - What you must know
  - What you must be able to do
  - MTC for Fenestration Surveying
  - MTC for Fenestration Installing

- Subject to annual inspection
- Subject to random pre- and post-installation inspection
- Offer an insurance backed guarantee
Approved Document A - Structure

- Adequate Structural Support
- Bay windows
- Lintels
- Most common complaint - insufficiently supported bays
Approved Document A - Structure
Approved Document B – Fire Safety

- Relatively low number of fails
- Most cases - incorrect hinge
- Few fails - complete removal of fire escapes
Approved Document B – Fire Safety
Approved Document C - Moisture Penetration

- Voids under sills, sometimes foam & packers visible
- Ends of sills & between frame & sill
- Poor installation techniques
Approved Document C – Moisture Penetration
Approved Document F - Ventilation

- 2 Ventilation Types: -
  - Purge – rapid air change
  - Background - Trickle vents

- Emotive subject – customers sometimes request that trickle vents are not fitted - resulting in failure

- Must “make no worse”
Approved Document F - Ventilation
Approved Document J – Combustion Devices

- Very few failures but taken extremely seriously
- AD J failure activates an emergency procedure – the inspector must call line manager immediately

- 2 areas of concern: -
  - Combustion Ventilation removed but still required
  - Opening sashes moved too close to flues
Approved Document J – Combustion Devices
Approved Document K – Risk of Falling

- 3 key areas of concern: -
  - Openings created below 800mm from floor level
  - Balconies – particularly “Juliet” style
  - Patio door replacements with French or Bi-Fold where original was at height.
- Rare fail – usually down to early registration
Approved Document K – Risk of Falling
Approved Document L – Conservation of Fuel and Power

- Introduced in 2002 – Main driver behind fenestration CPS
- Updated several times since 2002
- Compliance 53% WER and 47% U-Value
- $U_w \leq 1.6$ or WER $\geq$ C rated

Main reasons for failure are:
- Missing Low-E
- Incorrectly made units
Approved Document L – Conservation of Fuel and Power
Approved Document M – Access

- Applicable to main access point of building only
- Threshold
- “Make No Worse”
- Not necessarily specialist low threshold
- Very few failures
Approved Document M - Access
Approved Document N – Safety Glass

- Most common reason for inspection failure

- No single reason:
  - Survey
  - Manufacturer error
  - Installation
  - Economic
Approved Document N – Safety Glass
BFRC Mission Statement

To provide an easily-understood means to allow homeowners to compare the relative energy performance of fenestration products, and thereby encourage them to purchase more energy efficient solutions
European Energy Labels

- In 1992 EU Directive 92/75/EC established an energy consumption labelling scheme
- Superseded in 2011 by EU Directive 2010/30/EU
European Energy Labels

- Cookers
- Ovens
- Dishwashers
- Refrigerators
- Washing Machines
- Tumble Driers
- Televisions
- Vacuum Cleaners
- Light Bulbs
- Cars
- Tyres
BFRC Rated Products

- Windows
- Roof Windows
- French Doors
- Sliding Patio Doors
- Sliding / Folding (Bi-fold) Doors
- External Pedestrian Doors (Front and Back Doors)
BFRC Timeline

- 1997 - Partners in Technology Proposal
- 2000 - Completion of SAVE II EWER Project
- 2001 - BFRC established by Dr Robin Kent
- 2005 - First WER Licences Registered
- 2006 - BFRC Ltd established as subsidiary of GGF
- 2010 - Introduction of SEL
- 2011 - Introduction of DSER
- 2013 - Launch of A+ Band for Windows and Glazed Doors
- 2015 - Launch of A++ Band and re-banding of External Pedestrian Doors
What Are Window And Doorset Energy Ratings?

- Not a means of determining the specific energy performance of a given window or door in a given installation, location or orientation.
What Are Window And Doorset Energy Ratings?

- An easily understood metric to compare the energy efficiency of different window and door specifications.
- Put simply – “a better ruler”
Accurate ratings are produced as a result of precise thermal simulation of the frame, the glass and the interaction between the two, carried out by trained and certified simulators.
BFRC Principles

Fair

Accurate

Homeowners can easily compare competing products on a fair and equitable basis

Credible
The house, occupancy and climate information is used with a computer model to find the UK values of the coefficients A and B.

\[ A \times g_{\text{window}} - B \times (U_{\text{window}} + L_{\text{factor}}) \]

The BFRC Rating Formula, where:  
\[ A = 218.6 \quad B = 68.5 \]
Applicable Standards

- European CE Marking Regulations (BS EN 14351) dictates standards used.

- $U_w$  BS EN ISO 10077
- $g_w$  BS EN 410
- $L_{50}$  BS EN 1026
Obtaining a BFRC Energy Licence

1. Assess standard window style
2. Perform Calculation
3. Assess bands
4. Check Quality Management
5. Issue license
Band Cut-Offs

- A++ WER \geq +20
- A+ WER +10 to +20
- A WER 0 to +10
- B WER -10 to 0
- C WER -20 to -10

- Units are kWh/(m^2.yr)
Factors Affecting Growth of Window Energy Licences

- Prior to 2006, WER scheme was a marketing tool only
- 2006 – WERs Cited in UK Building Regulations (band E or $U_W = 1.8$)
- 2010 – Building Regulations Revised (band C or $U_W = 1.6$)
- 2013 – Building Regulations Revised (Windows Unchanged, Introduction of Roof Windows and DSER band E or $U_D = 1.8$)
Growth of BFRC Licence Registrations

Total WER Licences


0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000
FENSA Energy Ratings

- Technically identical to BFRC scheme
- Just branded FENSA
- Scheme operated on FENSA’s behalf by BFRC
- Independently verified by BFRC
Detailed Energy Licences

- Full WER Simulation Report
- Specific Frame and IGU Combination

- Provides details of:
  - U value
  - g value
  - Air Leakage Factor
  - Specific Energy Index
Issues with Detailed Energy Licences

- Too prescriptive
- Inflexible
- No changes of components
- Difficult to bring new products to market
- Installers wanted greater involvement
Simplified Energy Licences

- A Simplified Energy Licence is a group of simulations within a WER banding
- Covers multiple specifications for a given window system
Migration of Energy Licences

Effect Of Simplified Energy Licences
Substitution of Components

- **Simplified Energy Licences**
  - No substitution allowed
  - New combinations must be added to scope

- **Detailed Energy Licences**
  - Substitution is allowed provided window rating *does not decrease*
  - **Glass**
    - $U_g$ must be same or lower
    - $g$ must be the same or higher
  - **Spacer Bar**
    - Indicative Psi value must be the same or lower
Substitution of Components

### Data sheet Psi values for windows

<table>
<thead>
<tr>
<th>Component</th>
<th>Space width mm</th>
<th>Material</th>
<th>Molar mass psi vale</th>
</tr>
</thead>
<tbody>
<tr>
<td>MULTITECH 8</td>
<td>6.5</td>
<td>Frame</td>
<td>0.036</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spacer &amp; glazing</td>
<td>0.031</td>
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<td></td>
<td></td>
<td>Glass</td>
<td>0.030</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frame</td>
<td>0.031</td>
</tr>
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<td>MULTITECH 5</td>
<td>6.5</td>
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<td>0.030</td>
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<td></td>
<td></td>
<td>Spacer &amp; glazing</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Glass</td>
<td>0.028</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frame</td>
<td>0.029</td>
</tr>
</tbody>
</table>

Can be used for all spacer widths

*Note: The table values are based on the specified thermal conductivity of glass by measurement.*

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### Energy Window

- **A++**
- **A+**
- **A**
- **B**
- **C**
- **D**

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**FENSA**

Energy Efficient Windows + Doors

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**BFRC**

Energy Efficient Windows + Doors
Cascading of Energy Licences

System House licence

SEL

BFRC

DEL

Fabricator / licence holder

Fully Glazed WER Product

Authorised Retailer

Audit

Unglazed WER product + Glazing instruction

Authorised Retailer

IGU manufacturer

Installation of WER window

Fully Glazed WER Product

Installer
Consumer Confidence

- Every Licence Application
  - Checked by BFRC Staff

- Every Rating Calculation
  - Independently Verified

- Energy Licence Holders
  - Audited by either Independent Agency or Systems Company
  - (in turn audited by BFRC)

- Authorised Retailer
  - Audited by FENSA’s inspection body
BFRC / FENSA Energy Certificate

“How do I know I’ve got the windows I paid for?”
BFRC Certified Simulators

- No restriction other than competence
- Initial training and assessment
- Ongoing professional development and training
- Annual re-certification
Impact of Energy Licences on Component Suppliers

- UK coated glass market split: -
  - $\varepsilon = 0.01$ used for low U value for new-build and commercial (non-dwelling)
  - $\varepsilon = 0.05$ used for WERs for replacement domestic market

- Warm Edge spacer bars now dominate market (must pass BS EN 1279)

- Uptake of low iron glass – approx. 40%

- Introduction of A+ and A++ bands driving adoption of triple glazing
Has BFRC Been Successful?

<table>
<thead>
<tr>
<th>Year</th>
<th>A+</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
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<tbody>
<tr>
<td>2010</td>
<td>0%</td>
<td>40%</td>
<td>6%</td>
<td>54%</td>
</tr>
<tr>
<td>2011</td>
<td>0%</td>
<td>42%</td>
<td>11%</td>
<td>47%</td>
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<td>4%</td>
<td>64%</td>
<td>6%</td>
<td>26%</td>
</tr>
<tr>
<td>2015</td>
<td>5%</td>
<td>67%</td>
<td>6%</td>
<td>22%</td>
</tr>
</tbody>
</table>

2015 – 78% of rated windows sold exceeded minimum Building Regulations (Part L) requirements (FENSA registered installations)

WERs have driven technical innovation (frames, glass coatings, warm-edge spacers)
Thank You for Listening

Any questions?

BFRC: www.bfrc.org
FENSA: www.fensa.org