

Choosing Energy Efficient Windows For Your Home



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Choosing Energy Efficient Windows For Your Home



- What general factors should be considered for all windows
- Weather tightness
 - Air permeability (see also L₅₀ factor)
 - Watertightness
 - Resistance to windload
- Security
- Acoustics
- Safety – egress windows, protection from falling
- Certification Schemes

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- What factors affect the energy efficiency of windows?
- g_L – light transmittance factor (glazing)
- g_{\perp} – total solar energy transmittance factor (glazing)
- L_{50} – air permeability of frame at 50 Pa
- Background ventilation (approved document F)
- Uncontrolled air infiltration
- U_w – thermal transmittance of window

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- g_L – light transmittance factor (glazing)
- This is a measure of the amount of light that can pass through the glazing and affects the amount of energy used for daytime lighting

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- g_{\perp} – total solar energy transmittance factor (glazing)
- This is a measure of the amount of solar energy that can pass through the glazing and affects the amount of energy used for heating
- Some well insulated dwellings could use more energy for cooling – solar over-heating

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- **L_{50} – air permeability of frame at 50 Pa**
- **This is a measure of the amount air that passes through the window, around seals etc. and affects the amount of energy used for heating**

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- **Background and rapid ventilation**
- **Background and rapid ventilation is used to control the air quality inside a dwelling and can reduce condensation.**
- **Guidance for ventilation is given in Approved Document F**
- **Poorly controlled ventilation can add to the air infiltration of a dwelling and can affect the amount of energy used for heating.**
- **For rapid ventilation it is likely that at least one window in a room must be openable.**

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- **Uncontrolled air infiltration**
- **Air infiltration around the junction of the window and the opening must be controlled. Guidance is given in approved document L.**
- **Pressurization tests can show where uncontrolled air infiltration is occurring.**
- **Air infiltration can affect the energy used for heating.**

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- What factors affect the thermal transmittance of windows?
- U_w – thermal transmittance of window
- Windows of a variety of materials can be fabricated to produce similar amounts of thermal transmittance.

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- What factors affect the thermal transmittance of windows?
- U_w – thermal transmittance of window
- U_f – thermal transmittance of frame
- U_g – thermal transmittance of glazing
- Ψ – linear thermal transmittance of the junction with the glazing

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Model window 750mm x 1500mm single casement

16mm air aluminium spacer $U_w = 1.8 \text{ W/m}^2\text{K}$, $U_g = 1.4 \text{ W/m}^2\text{K}$

16mm air warm edge spacer $U_w = 1.6 \text{ W/m}^2\text{K}$

16mm air warm edge spacer, reduced frame $U_w = 1.5 \text{ W/m}^2\text{K}$

16mm argon aluminium spacer $U_w = 1.6 \text{ W/m}^2\text{K}$, $U_g = 1.2 \text{ W/m}^2\text{K}$

16mm argon warm edge spacer $U_w = 1.4 \text{ W/m}^2\text{K}$

12mm krypton aluminium spacer $U_w = 1.5 \text{ W/m}^2\text{K}$, $U_g = 1.1 \text{ W/m}^2\text{K}$

12mm krypton warm edge spacer $U_w = 1.4 \text{ W/m}^2\text{K}$

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Window Energy Ratings (WER)

Uses:

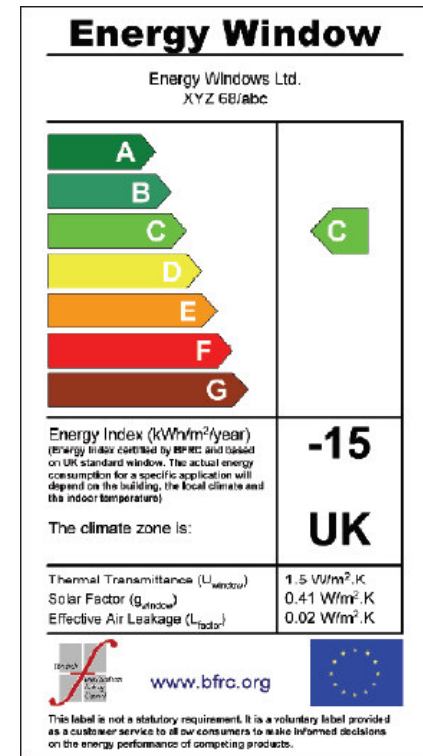
U_w – thermal transmittance of window

L_{50} – air permeability of frame at 50 Pa

g_{\perp} – total solar energy transmittance factor (glazing)

WERs Can be used to compare the energy efficiency of window types

WERs are not a measure of the energy use of an individual window





Thank You

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