



Performance

The **Wood Window** Alliance



**WOOD. AT THE HEART
OF A GOOD WINDOW**

Nowadays windows have to perform against a number of criteria.

Windows made by Wood Window Alliance members are 3rd party accredited and are able to meet the following criteria:

- Energy-efficiency
- Proof against more extreme climate conditions
- Security
- Noise reduction
- Low maintenance
- Durability.

Service life performance

- BRE's service life predictions suggest a minimum service life of 35 years, while further case study evidence predicts a minimum of 40 years
- There is no reason why, with the correct maintenance and appropriate repairs, wood windows will not last for the life of a building. There are many examples of wood windows remaining in service for over a 100 years



- Windows carrying the Wood Window Alliance quality mark carry warranties that demonstrate confidence in the performance of the products. They vary by manufacturer, but are typically:
 - 35 years on the life of the timber frame
 - 10 years on the glazing and ironmongery
 - 8 - 10 years on the paint finish.

Factors affecting durability performance

Research undertaken by the BRE over the past seven years has provided evidence of the main factors which ensure an extended service life for wood windows:

- The quality of the wood
 - Some windows achieve their durability by using high quality, slow growth timber, with a high proportion of heartwood
 - Others use engineered timber, where finger-jointing or laminated timber are used to produce straight, knot-free sections
- The use of preservative treatment
 - Most softwood windows have been pressure treated with a preservative. The effectiveness of this treatment allows the manufacturers to offer extended durability warranties. The treatment does not affect the end-of-life disposal of the windows
 - Alternative forms of preservative treatment, like heat treatment, or acetylation are increasingly available
- The species of wood
 - Some types of wood are more durable than others and may not need chemical treatment
 - Hardwoods are generally the most durable, but care must be taken when selecting them. Always insist on material with traceable certification or chain-of-custody certification from the manufacturer



- The effectiveness of the coating
 - Factory coatings are applied in controlled conditions and to specific coating thicknesses
 - Coatings should be applied to good quality heartwood, laminated or finger-jointed timber substrates. Knots and other defects should be low in density and restricted to non-visible areas or, preferably, removed
 - High-build film coatings are usually spray-applied onto an effectively applied base-stain or primer coating
 - Heavily pigmented opaque coatings protect the timber from UV light damage and lead to a longer paint life
- The detailing of the window
 - The design of the window should ensure that a 4 degree slope is achieved on horizontal sections such as cills, bottom beads and transoms to allow for rainwater run-off
 - Sharp edges should be avoided to allow for good paint adhesion
 - Large cills or cill extensions / overhangs are unnecessary and should be avoided
 - An angled stone, concrete, brick, slate, or tile cill should be considered as an alternative
- The design of the building
 - For maximum durability and protection, windows should be set back from the face of the building
- The orientation of the window
 - South-facing windows, which are most exposed to the sun, will need redecoration sooner than less exposed windows
- The maintenance period of the window
 - Users should be made aware of, and adhere to, the maintenance period given by the window manufacturer and paint/stain supplier.

Wood Window Alliance members offer windows with extensive warranties on the coating, extending maintenance intervals to eight years and beyond

Maintenance performance

- Modern methods of factory coating ensure that the important end-grain wood in joints is protected and deliver a precise thickness of coating
- No window material is maintenance free
- Maintenance will be affected by:
 - the design of the window
 - its location in relation to prevailing weather
 - its vulnerability to airborne dirt and grime
 - whether access to the window is difficult, for example in high-rise buildings
- Paints have longer maintenance intervals than stains; lighter colours, or white, have longer maintenance intervals than darker colours, as darker colours absorb more heat
- The quality of factory coating makes refinishing a simple job which requires limited preparation and a single recoat
- Where access to a window is limited, consider specifying a fully reversible style. This allows the window to be cleaned and decorated from inside the building, or an 'easy clean' style which opens on a cantilever to allow access to the outside of the window
- To minimize maintenance still further, aluminium-faced wood windows are often considered for high-rise buildings.

Thermal performance

- Energy efficient windows are a Building Regulations requirement – (Approved Document L or Part L) for all buildings, with the exception of listed buildings
- All windows carrying the Wood Window Alliance quality mark come double or triple-glazed, and are effectively designed and sealed to be weather-proof
- Because of timber's inherent strength, triple-glazing is more practical and cost-effective with wood windows than with other materials
- The most efficient size of glass-to-air gap to produce a double glazing unit (IGU) is 4mm glass – 16mm air gap – 4 mm glass, thus forming a 24mm IGU (4-16-4)
- Overall U-values of IGUs can be improved further by altering the internal and external transfer of heat by conduction, convection and radiation of the glass and the gas medium (air):
 - Conducted and convected heat by replacing the air with a gas with lower thermal conductivity (argon or krypton)
 - Radiated heat, by using glass with a low-emissivity coating (Low-E glass)

The table below shows how this is reflected in the IGU U-values

Single glass	5.8
Standard double glazing (4-16-4)	2.7
Double glazing with Low E glass – air filled	1.3
Double glazing with Low E glass – argon filled	1.1
Double glazing with low E glass – krypton filled	1.0

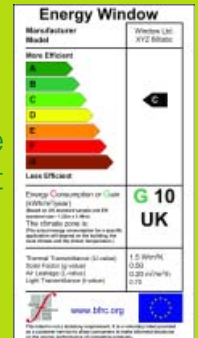
Simulated U-values for the whole window will differ from the above because they take the frame dimensions into account.

Triple glazed units would provide a lower U-value of less than 1.0 Wm²k

- WER is not the only way of assessing the energy efficiency of a window
- There is little or no difference between the thermal performance of wood and PVC-U windows when each are glazed with the same double glazing units
- In assessing the thermal performance of windows, the weather performance, or weather tightness, of the window

The Window Energy Rating (WER) – a way of showing a window's energy rating in a similar way to white goods etc, uses a combination of three factors:

1. Thermal transmittance of the window frame and glass unit
2. Air leakage of the window
3. Solar gain factor



Frame material	Thermal conductivity W/m²K
Softwood	0.13
Hardwood	0.18
Rigid PVC	0.17
Aluminium	160.0
Steel	50
GRP	0.40

ISO 10077 – 2 : 2003: Thermal Performance of windows, doors and shutters. Calculation of thermal transmittance.

- should always be considered in addition to the U-value of the glass units
- Wood windows can be manufactured using IGUs with a variety of U-values to suit the specifier's or client's requirements
- Centre pane values – the U-value of the IGU only – help in establishing the starting point for assessing the overall U-value of the window. Other factors, such as the efficiency of the frame spacer-bar material and seals, should also be considered
- Establishing a high solar gain from the window requires a reduction in frame section and may affect the aesthetic appearance of the window
- Specifiers can decide to compromise on the U-value in favour of the aesthetic appearance of the window, or to maximise solar gain while compromising on the aesthetic appearance.

Weather performance

A window's ability to combat all aspects of the weather is essential and increasingly important as climate change leads to stronger winds and more extreme rainfall.

- There are performance standards for basic weather and mechanical performance of all types of window, whatever the frame material
- In the UK the standard for this performance is BS 6375, which is divided into Part 1 for basic weather resistance and Part 2 for the window's operation and strength characteristics
- Weather performance test evidence relevant to the window type should be requested by the client or specifier before making a final selection
- It is important to ensure that the client understands how the type of window selected will perform
- Check that any test evidence is verified by a third party accreditation body. This is particularly important when small, local manufacturers are involved in the supply process.

The Wood Window Alliance quality mark demonstrates that the window has third party weather performance accreditation.

Acoustic performance

- The current Building Regulations Approved Document E, Resistance to the Passage of Sound, demands that the issue of noise is addressed in the construction of new homes and the refurbishment of existing properties
- Acoustic performance is now an important part of planning and building design. Residents are also more aware of the problems of noise and less tolerant of noise pollution
- Single-glazing and even standard doubled-glazed units are not good sound insulators. Further improvements can be achieved by the use of thicker glass in the IGUs or more specialised glass
- For extreme situations, triple-glazing or the use of 'double windows', where a second glazed window or secondary glazing is introduced, should be considered
- It is important to specify the amount of sound reduction required and state the relevant frequency level. A sound engineer can help in determining the type of window required.

Security performance

- Most insurance companies demand ground floor window locks as a standard requirement
- Secure wood windows are available to meet all requirements
- Laminated glass can be used to enhance the security of ground floor windows and those adjacent to entrance doors
- Members of the Wood Window Alliance offer windows which comply with BS: 7950: 1997 specification for enhanced security performance of casement and tilt/turn windows for domestic applications
- Although this standard does not include certain window types, such as vertical sliding sash or fully reversible windows, these types have also been shown to meet the criteria required by the test.

Secured by Design

- Secured by Design (SBD) is the UK police initiative supporting the principles of designing out crime through effective crime prevention and security standards for a range of applications. It is managed by ACPO, the Association of Chief Police Officers
- The Secured by Design scheme functions on two levels:
 - An award to developers who build developments to Secured by Design standards
 - A licensing scheme for products which meet police preferred specifications
- In order to achieve Secured by Design license status, wood windows must comply to the standard BS 644, or the BWF Timber Window Accreditation Scheme and have 3rd part accreditation to demonstrate compliance with BS 7950 : 1997.

