PROSIECT
CARTREFI O
BREN LLEOL

THE
HOME-GROWN
HOMES
PROJECT

Wooden Windows

Specification Guidance for Social Housing

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SPECIFICATION GUIDANCE

This document provides information for specifiers and procurement specialists working on social housing projects. It is designed to help with the specification of low-carbon timber windows in a social housing context. It provides performance criteria and indicates what needs to be considered to achieve these in practice. Windows are an essential element of the building fabric and should not be discussed in isolation. They should be considered very early in the design process when deciding what build system to use.

This publication has been issued by Woodknowledge Wales as part of the Home-Grown Homes Project 2020.

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WHY SPECIFY TIMBER WINDOWS?

Windows provide an outlook on the world. They help set the tone and character for a building and the area in which it stands. Windows define natural lighting levels and thermal comfort essential for the wellbeing of residents. They offer sound protection and keep homes safe from intrusion. Windows are an essential part of the building fabric and as such contribute to a development's overall energy performance.

Modern factory-finished timber windows have a better environmental performance than any other window material. They have a longer service life and lower whole life costs than uPVC windows. Wooden windows can be repaired and recoated throughout their lifetime and are the best option for achieving zero carbon buildings. They can be sourced from local manufacturers using home-grown timber and support economic recovery in Wales.

The multiple benefits wooden windows deliver over their life-span in terms of maintenance, durability, embodied carbon, and other social and environmental aspects make them excellent value for money.

Specific benefits

- Better environmental performance: timber windows have the best carbon footprint of any material making them the perfect choice for zero carbon homes. Made from renewable material wooden windows are ready for the circular economy. Their energy performance makes them suitable for Passivhaus and standard requirements.
- Longer Service Life: standard factory finished timber windows have an expected service life of up to 65 years in average UK conditions. Modified timber windows or aluminium-clad options achieve an even longer service life.
- Lower whole-life cost: Wooden windows with a 60-year design life have lower whole-life costs than uPVC alternatives.
- Low maintenance: Modern, factory finished, windows do not need to be repainted for many years after installation. Many come with finish guarantees for up to 10 years and rot resistance up to 30 years.

HOW TO SPECIFY HIGH PERFORMANCE WINDOWS

Whether you're specifying windows for a new development or a retrofit project, to make your housing stock fit for a zero-carbon future you will need low carbon building elements like timber windows that deliver on a whole host of performance criteria. Windows are an essential part of the building fabric and should be considered early on in the process alongside your chosen build or retrofit solution. To ensure installation of high-quality windows in line with your specifications, in the context of Design + Build contracts we recommend novation of a window supplier.

PERFORMANCE CRITERIA AND INDICATORS

What does good look like and how could you achieve this in your project? Windows need to deliver on a range of aspects from light provision to thermal comfort to safety and security of residents. We've listed key factors and what to consider when specifying windows for social housing to help you get what you need.

Energy performance has become a decisive element and building regulations are expected to require much higher performance levels from 2025, forecast to be near or equivalent to Passivhaus level. Security requirements are another key performance aspect. In Wales, all social housing must be built to Secured by Design Gold standard in line with The Welsh Housing Quality Standard and Development Quality Requirements. Windows need third party certification to PAS 24 2016 standard and need to meet further material related standards. To satisfy the growing demand from social housing providers for SBD certified wooden windows, a joint specification for a Welsh timber window for Social Housing is currently being developed in a Welsh Government funded project.

The reference standard for wooden windows is BS 644: 2012 (Timber) or BS 8529: 2017 (Composite). Information on all relevant industry standards for timber window components and their performance can be found here.

Windows need to be assessed in the context of overall building performance in terms of energy, light levels, thermal comfort and embodied carbon. Programming is crucial to achieve high performance levels. For optimal results on building performance, we recommend consulting a building physics and low carbon specialist.

DESIGN AND AESTHETICS

Windows provide architectural character and can convey perceptions of value, security and longevity. Before choosing a window type, be clear about the aesthetic appearance you want to achieve. Keep in mind that different types of designs may require different maintenance regimes.

Window design & types

For both new-build and retrofit, casement windows are the most specified window type in social housing. Decide between traditional flush casements and modern stormproof options which provide better weather protection.

Casement windows come with a range of opening choices. Traditionally, UK windows are outward opening and this is still the most specified window type. Recently, inward opening windows have become more popular due to ease of maintenance, better cross-ventilation and the option to use external shutters to provide shading and heat protection. Tilt&Turn windows are the chosen option for properties that are difficult to clean from the outside and which require secure ventilation. Find more information on casement windows here.

Sash windows have become less common but are still specified for replacement windows in traditional housing. Find more information on sash windows here.

Aesthetic appearance

When choosing a type of window finish for aesthetic appearance, make sure you understand what the impact of a particular design on overall costs and maintenance regimes is likely to be.

Natural

For a natural look choose products treated with an appropriate preservative or specify modified wood like Accoya or Brimstone. For better protection surface coatings can be applied. Please be aware that most 'natural look' options come with either lower service life or higher maintenance requirements and are not recommended for social housing.

Stains and paints

Stains allow for a natural appearance of the wood but with added colour, while paints will hide the grain of the timber. Solid colours better protect the surface from UV light damage and give longer maintenance intervals than clear or translucent finishes. White and pale colours provide better protection to the frame against solar and thermal gain than darker colours.

Solid paint systems are applied to a depth of between 60µm and upwards of 100µm and hence provide a longer-lived finish before first maintenance. The time to first maintenance may be significantly extended with factory finished opaque coatings being applied under controlled conditions.

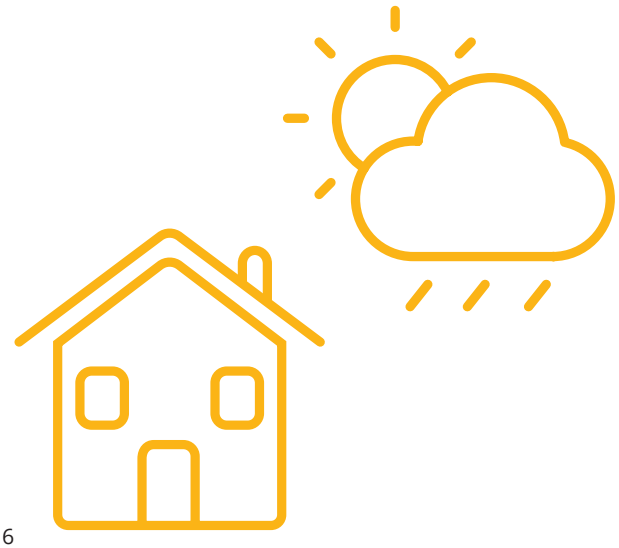
Specify moisture permeable coatings that are resistant to cracking, flaking and peeling. Modern moisture vapour permeable paint finishes are flexible and allow entrapped moisture a ready means of escape through the coating film. They are ideal for joinery and are available in solvent and water-based forms.

Aluminium-clad

Aluminium-clad timber windows are increasingly used for contemporary style domestic homes and multi-storey apartments. They combine the environmental and aesthetic benefits of wood on the inside with the durability and low maintenance of an aluminium skin on the outside. Aluminium-clad windows are of particular benefit on high-rise projects to reduce the need for regular maintenance of the exterior surface.

MATERIAL PERFORMANCE

Different types of wood are suitable for modern high performance windows. The principal decision when specifying the species of timber for joinery is whether it should be a softwood or hardwood based on aesthetic aspects of appearance and long-term durability. BS EN 942 offers some guidance. An important aspect in the selection process is the natural durability of a species. Definitions of durability are based on a five-point scale ranging from "Very durable" to "Not durable" (see BS EN 350-2). Durability classes apply to the heartwood only. All sapwood is classed as "Not durable".



Softwood

Various types of joinery grade redwood (e.g. Douglas Fir, pine) and larch are readily supplied from certified sustainably managed European forests. These may be engineered and laminated to remove knots and increase stability. Most softwood used in the UK is preservative-treated to ensure a long life.

Hardwood

Known for their natural durability some hardwoods, such as oak, are used for aesthetic reasons. Others, such as Sapele and Idigbo, are used for their stability.

Modified timber

Modification of wood can increase its stability as well as its durability, and have a positive effect on maintenance intervals. Recently, windows made from Accoya have become popular. Make sure to specify high quality stainless steel hardware for windows using modified timber to avoid adverse interactions between the timber and the window furniture.

OPERATIONAL PERFORMANCE

Windows should meet BS 6375-2 which defines performance requirements for the operation and strength of manually operated windows and internal/external pedestrian doorsets.

ENVIRONMENTAL PERFORMANCE

A regenerative zero carbon society requires building elements of the highest environmental performance across the following aspects.

Energy performance

Energy performance is measured in U-values and WERs (Window Energy Ratings).

U-values are a direct measure of thermal transmittance. Make sure to specify 'whole window' values between 0.8 W/m2K (Passivhaus) and <1.4 W/m2K (standard) for new developments.
WER gives an A to E rating based on a combination of U-value, air leakage and solar gain. A modern window should achieve A-A+ ratings to be fit for the zero carbon society.

Windows with highest energy efficiency ratings are typically argon or krypton filled and use Low-E glass.

Acoustic performance

BS EN ISO 717-1 specifies acoustic performance. For higher requirements acoustic glass, with performance up to 44Rw+Ctr can be specified.

Carbon footprint

The carbon footprint of a standard timber window is extremely low. Research by Heriot Watt University has found that using a timber window instead of uPVC saves roughly 160kgs CO2e over 60 years in average conditions. For aluminium-clad timber windows it is roughly 140kgs CO2e per window over the same time period. In a 10-window house, this adds up to 1.4t CO2e. We'll let you do the maths for your development...

Certified timber

Timber is a precious resource. It must be legally sourced in accordance with the European Timber Regulations and should be covered by chain of custody certification, e.g. PEFC or FSC, or supplied from a local forest in Wales.

Health & wellbeing

For your windows to be good for the planet as well as for your residents, specify coatings to be water based, with VOC below 50g/l and without heavy metal additives. Further information here.

SAFETY & SECURITY

In Wales, all social housing must be built to Secured by Design Gold standard in line with The Welsh Housing Quality Standard and Development Quality Requirements.

Safety

Specify windows with child safety locks to restrict opening to 100mm. Doors, door side panels, low windows and low level glass in walls and glass partitions must have safety glass or safety guards to comply with building regulations. Safety glass should be fitted when closer than 800mm to the floor level. Glass panels <250mm wide can be fitted with 6mm or laminated glass instead of toughened glass. To ensure doors and windows can be operated safely by wheelchair users, specify 'Lifetime Homes' compliance.

In addition, certain windows need to provide a means of escape in case of fire (egress). Please consult recent building regulations prior to specifying windows.

Security

Under current regulations windows and doors need to be specified to PAS 24:2016 and certified Secured By Design (see above).

SERVICE LIFE

Provided that they are well maintained, the lifespan of a typical timber window made to modern standard specifications will last for 60 years. Timber windows can be repaired which can prolong their service life well beyond the standard lifespan indicated above. The reference standard for desired service life sets out categories of 15, 30 and 60 years (BS 8417: Timber Preservation - Code of Practice).

The durability rating of a chosen wood species will determine the "desired service life" of the joinery which will indicate how long the timber is likely to withstand decay. If the service life for a given species is insufficient, it may be increased through the application of a preservative or by the selection of a more durable species.

An independent study by Heriot Watt University (2013) has found the following planned service life spans for wooden windows:

- 60 years for standard timber;
- 70 years for modified timber;
- 80 years for aluminium-clad timber.

The study showed that the planned service life for timber, under standard climate conditions and with the advised minimal maintenance is double that of a uPVC equivalent.

As a minimum requirement the elements of a standard timber window design should have the following service life:

- Frame – 30 years
- Paint Finish – 8 to 10 years
- Stain Finish – 5 to 7 years
- Glazing – 10 years
- Ironmongery – 10 years

Weather performance

Modern timber window designs and finishes shed water, minimize water retention and damp penetration. High quality softwood windows will be suitable for most housing in the UK. For multi-storey buildings or severe exposure conditions, enhanced materials, such as modified timber or aluminium-clad timber should be considered. Specify windows tested to BS 6375-1 for air permeability, water-tightness and wind resistance.

Frame protection

Windows should be set back into the reveal to protect the frame from the worst of the elements. They should be set on a stone, tile, aluminium or concrete cill, not on extended timber cills. The cill should be angled or throated or both to ensure good water run-off. Specify factory-finished windows and doors to ensure accurate coating application and special attention to vulnerable areas such as joints and end-grain. These should be end-grain sealed prior to assembly. All plane transitions such as angled rises on beads and cills should be rounded to at least a 3mm radius to prevent retraction of the coating in its wet state during application. This will help prevent premature coating failures from occurring along sharp edges.

MAINTENANCE REQUIREMENTS

Timber is a natural material and requires some maintenance during its lifetime. Be clear what maintenance schedules are acceptable for your housing project.

How easy is it to access the windows for maintenance or repair? What health and safety measures are required to do so, e.g. scaffolding? How much disruption will it cause? How do these factors impact on costs? If access for maintenance is costly, as with multi-storey buildings, low maintenance solutions, such as modified timber or aluminium-clad timber should be considered.

Coatings & aluminium cladding

Coatings extend the service life of timber but will require recoating at some point:

- Factory-finished with specialist spray-coated paint: 8 to 10 years [1]
- Paints and stains (general): 5 to 7 years
- Clear coatings: annual. These are not recommended.
- Modified timbers with coating: up to 9 years or more [2]

Aluminium-clad windows will typically remain maintenance-free for 30 years or more. The clip-on cladding can be replaced or refurbished.

Hardware

Whether you're choosing uPVC, aluminium or timber, all windows require annual oiling and cleaning of hinges and locks for best performance and durability.

Service Contracts

Some window manufacturers are offering maintenance packages for their windows. This makes financial planning for maintenance and repair easy and reliable and takes the pressure of your inhouse facility management team.

Ask your supplier about options for a maintenance service contract for your timber windows.

CALCULATING WHOLE LIFE COST

Comparing uPVC, timber and aluminium clad options, research suggests that high quality softwood provides the lowest Whole Life Cost in most conditions. Modified timber or aluminium-clad timber are more expensive but offer extended service life and maintenance intervals. They have been shown to have the lowest lifetime cost for multi-storey buildings or severe exposure conditions.

1. Please verify with your supplier
2. Based on reports from independent authorities in Europe the available test data suggest that using "Accoya" in combination with more extensible water-based surface coatings results in at least a doubling of the anticipated lifetime to first maintenance compared to non-modified softwood. In a trial carried out by Teknos (reported and authenticated by BM TRADA), the use of "Accoya® Wood" as a material for finished cladding has shown that its use can extend the typical lifetime to first maintenance of medium-build transparent exterior wood stains by at least a factor of 3 meaning that its estimated lifetime to first maintenance in a natural exposure environment would be up to 9 or more years.

USING HOME-GROWN TIMBER

Home-grown timber offers the best solution to support your local economy and maintain employment options in your community. While it is possible today to get well-designed PAS 24 compliant windows made from Welsh timber, there are currently no manufacturers who have certified their windows to Secured by Design (SBD) standards. From 2021, SBD certified windows using Welsh timber should be available from local manufacturers. Please contact Woodknowledge Wales for further information.

Suitable home-grown timber species:

Western Red Cedar

- very light with high stability and extreme resistance to decay
- ideal for painting and staining due to stability and lack of resin

Douglas Fir

- strongest homegrown softwood, used where impact damage may occur
- naturally durable, resistant against fungal and insect infestation
- medium weight with good stability

Oak

- high density, strength and durability
- rustic appearance / knotty

INSTALLATION

Installations need to be approved through the Building Control process or signed off by a company/individual registered with a relevant competent person scheme (e.g. FENSA). Local window manufacturers often offer installation. We recommend choosing installers that have previous experience of working with wooden windows or can provide evidence of appropriate training and supervision.

TECHNICAL INFORMATION

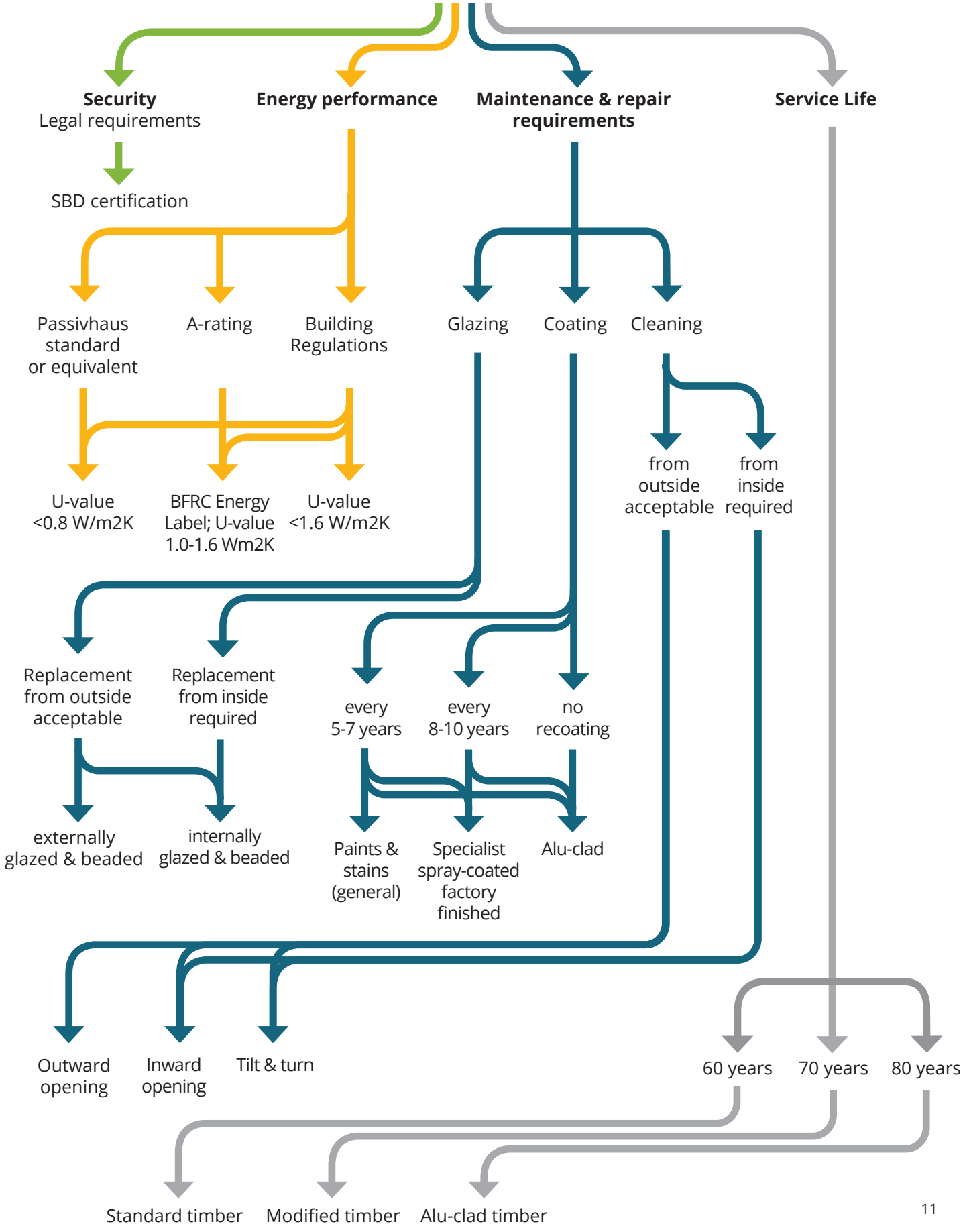
BM TRADA: Wood Windows. Designing for high performance. 3rd ed. by P Hislop

BM TRADA Wood Information Sheets:

- Finishes for external timber
- Modified wood products
- Durability by design

SPECIFICATION NAVIGATOR

Casement Window



CASE STUDIES

Find examples for use of timber windows in social housing across Wales here.

CONSTRUCTION GUIDANCE FOR SOCIAL HOUSING

Check out our range of guidance documents for specifiers and developers in Social Housing here.