L10Windows/ Rooflights/ Screens/ Louvres

Scope

This section deals with components of wood, metal and plastics, and with composite items combining these materials, usually fabricated off site, fixed into openings to give light or ventilation or to see through. Devices offering solar shading (e.g. brise soleil, awnings) are also included.
Accessories and associated items are included as follows:
- Architraves, trim, etc. where part of the component.
- Ironmongery where supplied with the component.
- Finishes where part of the component as delivered.
- Glazing where supplied with the component.
- Mechanical operating equipment where supplied with the component.
- Sealants.

This section does not include:
- Architraves, trim, etc. not supplied as part of a component – see section P20.
- Ironmongery supplied separately from a component – see section P21.

Use this section in conjunction with section B50 – General structural requirements.

Contents

Reference documents

For a list of documents cited in NBS, refer to the ‘Consolidated list of reference documents’ in the first binder of your service.

For a list of documents cited in this section, refer to ‘All reference documents for a work section’ on the subscriber website.

To check the currency of documents cited in this section, refer to the list of ‘New and amended reference documents’ on the subscriber website.

Publishers of documents citied in this section include:
- British Board of Agrément (BBA)
- British Plastics Federation (BPF)
- British Standards Institution (BSI)
- Building Research Establishment (BRE)
- Centre for Window and Cladding Technology (CWCT)
- Chartered Institution of Building Services Engineers (CIBSE)
- Construction Industry Research and Information Association (CIRIA)
- Council for Aluminium in Building (CAB) incorporating Aluminium Window Association (AWA)
- Steel Window Association (SWA)
- Timber Research and Development Association (TRADA)
- Wood Protection Association (WPA)

BRITISH BOARD OF AGRÉMENT (BBA)
Methods of assessment and testing (MOATs)

1 Directive for the assessment of windows
17 UEAtc Technical guide for the agrément of windows in PVC-U

BRITISH PLASTICS FEDERATION (BPF)
Publications:
362/2 Code of practice for the survey and installation of windows and external doorsets [2006 inc AMD 1]

BRITISH STANDARDS INSTITUTION (BSI)
BS 476-3 Fire tests on building materials and structures. Classification and method of test for external fire exposure to roofs [2004 + AMD 16169, + AMD 16924]

BS 476-22 Fire tests on building materials and structures. Methods for determination of the fire resistance of non-loadbearing elements of construction [1987]

BS 644 Timber windows. Fully finished factory-assembled windows of various types. Specification [2009]

BS 952-1 Glass for glazing. Classification [1995]

BS 3987 Specification for anodic oxidation coatings on wrought aluminium for external architectural applications [1991 + AMD 10944]

BS 4842 Specification for liquid organic coatings for application to aluminium alloy extrusions, sheet and preformed sections for external architectural purposes, and for the finish on aluminium alloy extrusions, sheet and preformed sections coated with liquid organic coatings [1984 + AMD 7181]

BS 4873 Aluminium alloy windows [2009]

BS 5250 Code of practice for control of condensation in buildings [2011]

BS 5357 Code of practice for installation and application of security glazing [2007]

BS 6213 Selection of construction sealants. Guide [2000 +A1:2010]

BS 6375-1 Performance of windows and doors. Classification for weathertightness and guidance on selection and specification [2009 + Corrigendum No. 1]

BS 6375-2 Performance of windows and doors. Classification for operation and strength characteristics and guidance on selection and specification (2009)

BS 6399-2 Loading for buildings. Code of practice for wind loads [1997 + AMD 13392, AMD 14009]

BS 6496 Specification for powder organic coatings for application and stoving to aluminium alloy extrusions, sheet and preformed sections for external architectural purposes, and for the finish on aluminium alloy extrusions, sheet and preformed sections coated with powder organic coatings [1984 + AMD 7182]

BS 6510 Steel framed windows and glazed doors – specification (2010)

BS 6949 Specification for bitumen-based coatings for cold application excluding use in contact with potable water [1991 + AMD 7287]

BS 7412 Specification for windows and doorsets made from unplasticized polyvinyl chloride (PVC-U) extruded hollow profiles [2007]

BS 7722 Surface covered PVC-U profiles for windows and doors. Specification [2010]

BS 7950 Specification for enhanced security performance of casement and tilt/ turn windows for domestic applications [1997 + AMD 14289, AMD 15666, AMD 16982]

BS 7956 Specification for primers for woodwork [2000]

BS 8118-2 Structural use of aluminium. Specification for materials, workmanship and protection [1991 + AMD 10486]

BS 8206-2 Lighting for buildings. Code of practice for Daylighting [2008]

BS 8213-1 Windows, doors and rooflights. Design for safety in use and during cleaning of windows, including door-height windows and roof windows. Code of practice [2004]

BS 8213-4 Windows, doors and rooflights. Code of practice for the survey and installation of windows and external doorsets [2007]

BS 8220-1 Guide for security of buildings against crime. Dwellings [2000]

BS 8220-2 Guide for security of buildings against crime. Offices and shops [1995]

BS 8220-3 Guide for security of buildings against crime. Storage, industrial and distribution premises [2004]

BS 8233 Sound insulation and noise reduction for buildings. Code of practice [1999]

BS 8300 Design of buildings and their approaches to meet the needs of disabled people. Code of Practice [2009]

BS 9991 Fire safety in the design maintenance and use of residential buildings. Code of practice [2011]

BS 9999 Code of practice for fire safety in the design, management and use of buildings [2008]

BS EN 204 Classification of thermoplastic wood adhesives for non-structural applications [2001]

BS EN 301 Adhesives, phenolic and aminoplastic, for load-bearing timber structures: classification and performance requirements [2006]

BS EN 314-2 Plywood. Bonding quality. Requirements [1993]

BS EN 356 Glass in building. Security glazing. Testing and classification of resistance against manual attack [2000]

BS EN 942 Timber in joinery. General requirements [2007]

BS EN 1026 Windows and doors. Air permeability. Test method [2000]

BS EN 1027 Windows and doors. Watertightness. Test method [2000]

BS EN 1063 Glass in building. Security glazing. Testing and classification of resistance against bullet attack [2000]

BS EN 1279-1 Glass in building. Insulating glass units. Generalities, dimensional tolerances and rules for the system description [2004]

BS EN 1279-2 Glass in building. Insulating glass units. Long term test method and requirements for moisture penetration [2002]

BS EN 1279-3 Glass in building. Insulating glass units. Long term test method and requirements for gas leakage rate and for gas concentration tolerances [2002]

BS EN 1279-4 Glass in building. Insulating glass units. Methods of test for the physical attributes of edge seals [2002]

BS EN 1279-5 Glass in building. Insulating glass units. Evaluation of conformity [2005+ AMD May 2009] (+A2:2010)

BS EN 1279-6 Glass in building. Insulating glass units. Factory production control and periodic tests [2002]

BS EN 1522 Windows, doors, shutters and blinds. Bullet resistance. Requirements and classification [1999]

BS EN 1991-1-4 Eurocode 1: Actions on structures. General actions – Wind actions [2005 +A1:2010]

BS EN 1999-1-1 Eurocode 9: Design of aluminium structures. General structural rules (+A1:2009) (2007)

BS EN 10346 Continuously hot dip coated steel flat products. Technical delivery conditions [2009]

BS EN 12046-1 Operating forces. Test method. Windows [2003]

BS EN 12208 Windows and doors – Watertightness – Classification (incorporating Corrigendum No. 1) (2000)

BS EN 12211 Windows and doors. Resistance to wind load. Test method [2000]

BS EN 12400 Windows and pedestrian doors. Mechanical durability. Requirements and classification [2002]

BS EN 12608 Unplasticized polyvinyl chloride (PVC-U) profiles for the fabrication of windows and doors. Classification, requirements and test methods [2003 + AMD 15388]

BS EN 12765 Classification of thermosetting wood adhesives for non-structural applications [2001]

BS EN 13123-1 Windows, doors and shutters. Explosion resistance. Requirements and classification. Shock tube [2001]

BS EN 13123-2 Windows, doors and shutters. Explosion resistance. Requirements and classification. Range test [2004]

BS EN 13438 Paints and varnishes. Powder organic coatings for galvanized or sherardised steel products for construction purposes [2005]

BS EN 14024 Metal profiles with thermal barrier. Mechanical performance. Requirements, proof and tests for assessment [2004]

BS EN 14600 Doorsets and openable windows with fire resisting and/ or smoke control characteristics. Requirements and classification [2005 + corr 2009]

BS EN ISO 1461 Hot dip galvanized coatings on fabricated iron and steel articles. Specifications and test methods [2009]

BS EN ISO 2063 Thermal spraying. Metallic and other inorganic coatings. Zinc, aluminium and their alloys [2005]

BS EN ISO 9001 Quality management systems. Requirements [2008+ Corrigendum July 2009]

BS EN ISO 10077-1 Thermal performance of windows, doors and shutters. Calculation of thermal transmittance. Simplified method (incorporating corrigendum November 2009) [2006]
BS EN ISO 12944-5 Paints and varnishes – Corrosion protection of steel structures by protective paint systems. Protective paint systems (2007)

DD 266 Design of accessible housing. Lifetime home. Code of Practice [2007]

UK National Annex to Eurocode 1: Actions on structures. General actions – Wind actions. [2005 + A1 2010]

BUILDING RESEARCH ESTABLISHMENT (BRE)
Digests:
377 Selecting windows by performance [1992]
379 Double glazing for heat and sound insulation [1993]
404 PVC-U windows [1995]
422 Painting exterior wood [1997]
Information papers:
16/81 The weatherstripping of windows and doors [1981]
25/81 The selection and performance of sealants [1981]
6/94 The sound insulation provided by windows [1994]
6/03 Improving air quality in homes with supply air windows [2003]
17/03 Impact of horizontal shading devices on peak solar gains through windows [2003]

CENTRE FOR WINDOW AND CLADDING TECHNOLOGY (CWCT)
Windows with enhanced resistance to intrusion [1994]

CHARTERED INSTITUTION OF BUILDING SERVICES ENGINEERS (CIBSE)
Applications Manual AM10 Natural ventilation in non-domestic buildings [2005]
Lighting Guide 10: Daylighting and window design [1999]

CONSTRUCTION INDUSTRY RESEARCH AND INFORMATION ASSOCIATION (CIRIA)
Report 178 Sealant joints in the external envelope of buildings: A guide to design, specification and construction [1998]

COUNCIL FOR ALUMINIUM IN BUILDING (CAB)
Setting the Standard No 2 'Aluminium windows. A guide to specification and design' [1999]

STEEL WINDOW ASSOCIATION (SWA)
Specifier's guide to steel windows (see www.steel-window-association.co.uk) [10th edition]

TIMBER RESEARCH AND DEVELOPMENT ASSOCIATION (TRADA)
Publication TBL 65 Wood windows. Designing for high performance [2009]

WOOD PROTECTION ASSOCIATION (WPA)
Industrial Wood Preservation. Specification and practice [2007]

General guidance

1 The performance of windows

1.1 Methods of assessment

Most aspects of window performance are covered by British Standards, the principal references being:

- BS 6375-1 covering weathertightness.
- BS 6375-2 covering operation and strength.

These standards apply to all types of window, including those with unframed opening lights (e.g. adjustable glass louvres) and opening lights within vertical patent glazing or curtain wall systems, but excludes patent glazing and curtain walls that span across horizontal structural members of floors.

Other standards give requirements or guidance for aspects such as security and sound insulation – see later.

Alternatively, window performance may be assessed by reference to the BBA windows directive (MOAT 1), which gives requirements for safety, habitability (air and watertightness, thermal conditions, sound insulation, appearance, lighting and operation) and durability. The windows directive is used, in conjunction with BBA MOAT 17, to assess the performance of PVC-U windows for the purposes of Agrément certification. Windows are classified in terms of:

- Air permeability (classes A1–A3).
- Watertightness (classes E1–E4).
- Pressure or suction resistance (classes V1–V3).

The performance characteristics are similar to those given in BS 6375-1, and the Agrément certificate for a particular product gives both the MOAT 1 gradings and the corresponding test pressure classes to BS 6375-1. The Agrément Certificate is awarded to a range of windows rather than to the window system (the profiles, etc. from which the windows are made), and it cannot be assumed that because a certificate is offered for one type of window it will apply to another type offered by the same manufacturer.

British Standards for window performance will be superseded by harmonized European Standards. These have already been published, and manufacturers are beginning to test their products in accordance with them. BS 6375-1 has been revised to take account of the European Standards and will eventually be replaced by BS EN 12208 for watertightness.

1.2 Weathertightness to BS 6375-1

BS 6375-1 defines weathertightness as performance in respect of air permeability, watertightness and wind resistance. The standard classifies windows for weathertightness in terms of exposure categories related to design wind load. Five exposure categories are designated, with their associated requirements for air permeability, watertightness and resistance to wind loading, as given below (Table1).

The European test standard for air permeability is BS EN 1026.

Whether specifying windows by prescription or by performance, the designer must first determine the local design wind load. The appropriate exposure category can then be selected. For example, if the design wind load is calculated as 1550 Pa, then the exposure category is 1600 (i.e. the next highest value above the design wind load). Where the calculated design wind load is just over one of the exposure category pressures, e.g. 1350 Pa, then stating the actual pressure may achieve economies in mullion/ transom sections and/ or glass thickness. If the calculated design wind load is greater than 2000 Pa then the calculated value should be stated in the specification.

For the purpose of classification, BS 6375-1, Annex A recommends two methods of determining the design wind loading for low rise buildings: the abbreviated method detailed in the annex to the standard, and the more accurate and less conservative method covered in BS 6399-2 (no longer current and superseded by BS EN 1991-1-4 and UK National Annex to BS 1991-1-4, but cited in the Building Regulations). The use limitations for the abbreviated method are defined as:

- The overall height of the building must not exceed 15 m.
- The method assumes a combined pressure coefficient (Cp) of 1.15, which takes into account the worst case that normally occurs. Higher coefficients might be experienced at points adjacent to the corners of the building.

A further option cited in BS 6375-1 is to obtain figures directly from the building designer.

Many window manufacturers now indicate the performance of their standard range products in terms of exposure categories. However it is still possible to find windows classed as high or moderate performance, or as suitable for use in severely exposed, moderately exposed or sheltered situations.

When specifying windows by proprietary reference, there is no need to specify the exposure category (unless the manufacturer offers a choice). However, the designer should check that the selected windows have been tested in accordance with BS EN 1026, BS EN 1027 and BS EN 12211 and have been given an exposure classification to BS 6375-1 suitable for the climatic conditions to which the windows will be exposed.

When specifying windows by performance, only the exposure category need be given in the specification. The window fabricator must then ensure that the finished components satisfy the associated requirements for air permeability, watertightness and wind resistance by testing prototypes to BS EN 1026, BS EN 1027 and BS EN 12211.

For background guidance on weatherstripping, see BRE Information Paper 16/81. Most weatherstripping will be fitted as standard by the window manufacturer.

1.3 Operation and strength characteristics

BS 6375-2 specifies performance requirements for the operation and strength of windows in their glazed and fully finished condition including hardware. The standard had originally been partially replaced by BS EN 12046-1, which provides test methods to determine the minimum static force or torque required to release or lock the hardware (locks or handles) of a window, and to commence opening and complete closing a casement or sash. BS 6375-2 has been updated but only provides classification for operation and strength characteristics, not test methods.

The test levels established by BS 6375-2 are based on forces capable of being applied by the majority of people. Where windows are to be used by elderly, infirm or young people the standard recommends that special consideration be given to the type of window, its location and its hardware. Tests are specified for:

- Operation of fastener.
- Movement of sash.
- Resistance to excessive operating force (sliding windows only).
- Release of jammed sash.
- Release of jammed hinge (projecting windows fitted with variable geometry hinges only).
- Strength of restricted opening and location devices and maximum opening stops.
- Resistance to accidental loading.

1.4 Endurance

The ability of a window to withstand repeated operation (opening and closing) can be assessed using the methods given in various European standards. The standard giving performance requirements and a classification system, BS EN 12400, specifies three performance classes:

- Class 1 – light duty (5,000 test cycles).
- Class 2 – moderate duty (10,000 test cycles).
- Class 3 – heavy duty (20,000 test cycles).

Specimens tested must not suffer such damage or deformation – including loosening of hardware, closing devices of their connections, joints or weather sealing systems, intumescent seals or smoke seals – as would render the window unfit for its purpose.

Specifiers are advised to choose window designs in which the hinges, fasteners and seals are robust and/ or easily replaced. Manufacturers are continually modifying the design of their products to improve performance, and the replacement of, for example, a weatherseal after five or ten years may pose a problem if the profile has changed.

1.5 Safety and security

The main aspects of safety and security are covered by code of practice BS 5357, as well as specific standards, as follows:

- Safety in use: BS 8213-1 gives recommendations on the design and construction of windows for safety in use, including positioning of operating controls.
- Intruder deterrence: BS 8220-1, -2 and -3 deal with ways of securing windows to deter intruders, and give guidance on the selection and fitting of locks and fastenings. Most window manufacturers offer security features, such as internal glazing beads, lockable fasteners, espagnolette (multi-point) locks, fitted as standard or as optional extras.
  CWCT standard ‘Windows with enhanced resistance to intrusion' specifies tests for intrusion resistance. A single performance category is defined. Recommendations are given for design, glazing, selection, fabrication and installation.
  Casement, top swing, vertical sliding and tilt/ turn windows for domestic applications can be assessed against BS 7950. Successful testing to this standard is a performance criterion set by 'Secured by design', the UK Police initiative supporting the principles of 'designing out crime' by use of prevention and security standards for a range of applications. For more information on the scheme and a list of approved products and suppliers, see the 'Secured by design' website.
- Impact resistance under manual attack: BS EN 356 gives impact tests, resistance categories and resultant code designations for glass in buildings.
- Bullet resistance: A classification system and requirements for bullet resistance of windows, shutters and blinds are given in BS EN 1522. Seven classes, FB1–FB7, are included for increasing resistance to attack by hand gun and rifle. Class FB1 represents the lowest bullet resistance, and class FB7 the highest. A single class (FSG) is given for resistance to shotgun attack. Test results are qualified by the addition of a suffix, (S) or (NS), according to the presence or absence of splinters, e.g. FB3(S), FB4(NS). The standard also gives the minimum class of bullet resistant glass (to BS EN 1063) to be used in the test. The glass classification is similar to that for the components, e.g. BR1 glass must be used in an FB1 window, BR2 glass in an FB2 window, and so on. FSG windows require SG2 glass.
- Explosion resistance: BS EN 13123-1 and -2 give a classification system and requirements for resistance of windows and shutters to high explosive detonation. Four classes, EPR1–EPR4, are given covering detonations in the order of 100–2500 kg TNT at distances from about 35–50 m. Again, the test results are qualified by the suffix (S) or (NS) depending on whether or not splinters originate from the protected face of the test specimen.
- Fire safety: BS 9991 and BS 9999 give general principles regarding location of windows and smoke and fire control which may be cross-referred to applicable building legislation. BS EN 14600 gives requirements and classification of fire resisting openable windows, as well as doorsets.

1.6 Thermal insulation/ condensation/ ventilation

Heat loss through the frame should be taken into account when calculating the U-value of a window. For uncomplicated profiles, the effect of the frame can be assessed on a proportional area basis. BS EN ISO 10077-1 gives a simplified method of calculating thermal transmittance. The calculation does not include effects of solar radiation, heat transfer caused by air leakage, calculation of condensation, or ventilation of air spaces in double and coupled windows. However, Annex D of the standard gives thermal resistance of frames, while tables in Annex F give U-values for windows in relation to percentage frame area.

BRE Digest 379 gives comparative U-values for a number of typical wood and metal windows. Wood and plastics have higher thermal resistances than aluminium and steel, which conduct heat easily and may create problems with cold bridging. Also, condensation may form on the window frame if the temperature of the surface falls below the dew point of the internal air. These problems can be moderated by the incorporation of a thermal break in the form of an insulating section that separates the inner and outer parts of the frame. Requirements for thermal barriers are specified in BS EN 14024.

Condensation forming on frames or on the inner face of windows may cause damage if it is allowed to remain in contact with wood sills or subframes, or if it runs off onto curtains, carpets or wall decorations. Where severe condensation is anticipated, drainage channels should be provided.

Building Regulation requirements for limiting U-values of windows and rooflights, and revised maximum U-values (area weighted average) for windows are now in force, and in order to meet the requirements it will be necessary to install more sophisticated insulating glazing units with larger cavities between panes, low emissivity glasses and, in some cases, inert gas cavity filling.

Double glazing reduces both the heat loss through a window and the amount of condensation forming on the glass, but this will result in the air having to retain an increased amount of water vapour, which may condense elsewhere unless provision is made for its removal, e.g. by ventilation.

Building Regulations require the provision of both ‘purge’ (rapid) and ‘background’ (whole building and extract) ventilation to habitable/ occupiable rooms, kitchens, utility rooms, bathrooms and separate sanitary accommodation, in both domestic and non-domestic buildings, see:

- **E&W** Approved Document F.
- **IRL** Technical Document F, Section 1.
- **NI** Technical Booklet K.
- **Scot** Technical Standard 3.14, Domestic or Non-domestic.

One way of meeting the requirement for purge ventilation to rooms other than kitchens is by providing one or more opening windows. In winter this will increase heat losses and is likely to cause discomfort: it also creates a security risk at any time, and locking devices that will hold the open light secure should be selected with care (see general guidance 1.5).

In order to satisfy the requirement for background ventilation, one alternative to installing mechanical ventilation is to provide trickle ventilators in or over window frames, and these are available to suit most types of window. ‘Free area’ values for tickle ventilators have been replaced with the more accurate ‘equivalent area’ values in Approved Document F (E&W).

Passive stack ventilation is also considered within the Building Regulations for background ventilation, and can obviate the need for mechanical extraction.

For further guidance on prevention and removal of condensation, see BS 5250. See also BRE Information Paper IP 6/03 ‘Improving air quality in homes with supply air windows’.

1.7 Sound insulation

There is a conflict of interests between sound insulation and ventilation requirements, and it is usually only possible to provide one at the expense of the other, although often a compromise solution is acceptable.

The sound insulation value of a window increases with the mass of the glazing material, and further improvement is possible with double leaf construction. However, most of the sound insulation value may be lost due to air gaps around opening lights, and there is little to be gained by installing thicker glass or a second leaf if the windows are not sealed effectively. Normal weatherstripping may not be sufficient, and the use of additional compression seals should be considered.

The air space between panes of double windows should be a minimum of 100 mm, and preferably more (BRE Digest 377 recommends at least 200 mm for optimum sound insulation). Performance may be improved by using sound absorbent linings on the reveals between the panes, and by mounting the glass in flexible gaskets to dampen resonances between the panes. See also BS 8233, clause 8.4.7 and BRE Information Paper 6/94.

2 Adhesives for joinery

BS 644 stipulates that adhesives used in the fabrication of wood windows must comply with the requirements of BS EN 204, type D3 (for concealed or semi-concealed joints) or type D4 (where joints are exposed).

Synthetic resin adhesives complying with BS EN 301 (e.g. resorcinol formaldehyde or phenol/ resorcinol formaldehyde), although mainly used for structural purposes, can also be used. However, they are more expensive and difficult to handle, and the dark glue lines they produce may not be acceptable in windows that are to be clear finished.

In window construction, synthetic resin adhesives are being replaced by chemically cured PVAC adhesives, which are safer and more 'user friendly'. Many are able to satisfy the requirements for the class D4 durability rating of BS EN 204, which means that they are suitable for use externally, exposed to the weather, provided they are adequately protected by a surface coating.

The adhesive must be compatible with the proposed finish and with any preservative treatment used. Where specification of a proprietary adhesive is preferred, the manufacturer should be consulted about its properties and suitability.

3 Quality assurance

Many window manufacturers have quality management systems in operation and have, or are pursuing, product conformity recognition of their products.

Quality management schemes are assessed, usually to BS EN ISO 9001, by independent certification and inspection agencies who, in turn, are accredited by the National Accreditation of Certification Bodies (NACB). Certification of a system leads to the award of Registered Firm status or a Certificate of Approval. Products manufactured under a quality management system must be consistent in quality but may not conform in all respects to a recognized standard.

Product compliance with recognized standards, e.g. BS 4873 for aluminium windows or BS 7412 for PVC-U windows, is assessed by regular examination and testing. Certified products may, in some cases, be marked with the certification trade mark of the inspection agency, e.g. BSI's Kitemark, SGS Yarsley's Testguard or BM TRADA's Q-Mark.

British Board of Agrément Certificates cover product properties to which British Standards cannot be applied, and confirm the product's suitability for conditions of use, e.g. in accordance with relevant Building Regulations.

Windows are usually selected for their appearance, provided that their technical qualities are appropriate for the conditions of use. The latter can be reasonably assured if certified products are specified.

An accreditation scheme for wood windows is operated by the British Woodworking Federation (BWF). All aspects of window specification are covered, and products supplied by accredited firms are permanently labelled with the BWF Accreditation Mark.

Where the Contractor is permitted to submit alternative windows (e.g. public contracts), defining appearance and quality can be a problem. The most direct method is to specify one or more products and include the statement 'or equivalent'. Alternatively, a quality assurance requirement can be specified, e.g. *Kitemark/ Testguard/ BM TRADA Q-Mark/ Agrément Certified.*

Windows specified by an open BS reference can have a product certification qualification added to the item in the relevant clause when the specifier has ascertained that accredited products are available.

4 Accessibility

DD 266 applies to housing and gives recommended levels in a living room or bedroom for sills (800 mm maximum from floor level) and transoms (1200 mm minimum from floor level) to allow a view to the outside when seated. One window should be openable by wheelchair users in living rooms and bedrooms, with the glazing to the opening light starting as close to 800 mm from floor level as possible where guarding and safety permit. Hardware should be appropriate for all ages and for those with limited dexterity, whilst being mindful of security.

BS 8300 applies to non-domestic scenarios and provides the same advice, but goes on to suggest window restrictors limit openings to 100 mm on upper floors and where windows open onto a pedestrian route, although guarding may be provided as an alternative. Such restrictors should be capable of being disengaged in case of emergency and for maintenance or cleaning. Fastenings should be between 800–1000 mm from floor level and not require the use of two hands; ideally they should be operable with the use of clenched fist or side of the hand. The document also gives recommended torque force depending on fitting type, as well as considerations if powered controls are to be fitted.

Manifestation should be considered for windows at a lower height; see BS 8300, 9.1.5 for guidance.

5 BREEAM

5.1 Daylighting

The BREEAM models award credits where building users are provided with sufficient access to daylight.

The credit criteria vary dependent upon building type, but all models require that a minimum percentage of occupied space is provided with a minimum percentage daylight factor, e.g.

- Schools and further education colleges: A minimum of 80% of floor area in occupied spaces is provided with an average daylight factor of 2% or more.
- Higher education buildings: A minimum of 60% of floor area in occupied spaces is provided with an average daylight factor of 2% or more.
- Retail properties: A minimum of 35% of the floor area of the sales and common spaces has point daylight factors of at least 2%.

In addition to satisfying the floor area/ daylight factor requirement, all BREEAM models also require that either minimum uniformity ratios are provided, or a view of the sky is provided from desk height and the room depth criterion is satisfied.

For further details, refer to the particular BREEAM Assessor manual, depending on building type. See also NBS and BREEAM for more information.

5.2 View out

The BREEAM models award credits where occupants are provided with a view out, to refocus their eyes from close work and enjoy an external view, thus reducing the risk of eyestrain and breaking the monotony of the indoor environment.

The credit criteria vary dependent upon building type but all typically define 'relevant building areas', e.g.
- Multi-residential buildings: All self-contained flats, individual bedrooms, offices and IT suites.
- Healthcare buildings: Any areas of the building where there are, or will be, workstations/ benches or desks for building users. In addition, for those buildings designed for in-patients, all patient-occupied spaces (e.g. wards and dayrooms).
- Education buildings: Any areas of the building where there are, or will be, workstations/ benches or desks for building users.

These 'relevant areas' must be within 7 m (5 m for defined areas within a multi-residential building) of a wall with a window or permanent opening providing an 'adequate view out' where the window/ opening is ≥20% of the total inside wall area.
Alternatively, where the room depth is greater than 7 m (5 m for defined areas within a multi-residential building), compliance is only possible where the percentage of window/ opening is the same as or greater than the values in table 1.0 of BS 8206-2.

An 'adequate view out' should ideally be through an external window providing a view of a landscape or buildings (rather than just the sky), and be from seated eye level (1.2–1.3 m) in the 'relevant areas'. A view into an internal courtyard or atrium may also comply, depending on the distance between the window/ opening and the opposite wall.

For further details, refer to the particular BREEAM Assessor manual, depending on building type. See also NBS and BREEAM for more information.

5.3 Glare control

In order to reduce problems associated with glare, the BREEAM models award a credit where an occupant-controlled shading system is provided on all windows, glazed doors and rooflights in all 'relevant building areas'.

The credit criteria vary dependent upon building type, but all typically define 'relevant building areas', e.g:
- Education buildings: Any areas of the building where there are, or will be, workstations/ benches, desks, and/ or close work will be undertaken or visual aids used.
- Healthcare buildings: Any areas of the building where there are, or will be, workstations/ benches, desks, and/ or close work will be undertaken or visual aids used, and any 'bedded areas'.
- Multi-residential buildings: Study bedrooms (student halls), offices, meeting rooms, IT suites, and any other areas where occupants will be doing close up work/ using display screen equipment where there may be a risk of glare.

In some BREEAM models, e.g. Healthcare and Prisons, additional requirements apply in all other occupied areas where the potential for disabling glare has to be designed out by one or more of the following measures:
- Brise-soleil.
- Low eaves.
- Bioclimatic design that provides shading from high level summer and low level winter sun.

Brise-soleil can be specified in this section, see clause 670.
Solar shading systems using awnings, external roller or venetian blinds can be specified in clause 680. Internal roller or venetian blinds can be specified in section N10.

For further details, refer to the particular BREEAM Assessor manual, depending on building type. See also NBS and BREEAM for more information.

5.4 Potential for natural ventilation

Several BREEAM models award a credit in recognition of, and to encourage, the provision of adequate cross flow of air in naturally ventilated buildings and the flexibility in air-conditioned/ mechanically ventilated buildings to allow for future conversion to a natural ventilation strategy. The award of a credit is dependent upon meeting multiple criteria, some of which differ, depending on building type, and some of which are applicable to one type of building only.

Significant parts of the credit criteria are common across different building types and typically require either one of two strategies to be implemented:
- The first relies on the openable window area in each occupied space being equivalent to 5% of the gross internal floor area of the room (where room depths are between 7–15 m the openable window area must be on opposite sides of the room and evenly distributed across the area to promote adequate cross-ventilation). Alternatively, an appropriate ventilation design tool, i.e. a type recommended by CIBSE AM10, must be used to calculate the optimal location and size of openable areas required to achieve the appropriate ventilation rate using a natural ventilation strategy.
- The second applies where there is no reliance on openable windows, or where room depths in occupied spaces exceed 15 m. Here, design calculations produced by an appropriate ventilation design tool, i.e. a type recommended by CIBSE AM10, must be used to demonstrate the ventilation strategy can provide adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates.

The strategy adopted must be capable of providing at least two levels of user-control on the supply of fresh air to the occupied space, with higher rates of ventilation achievable to remove short-term odours and/ or to prevent summertime overheating. Typically this can be demonstrated by providing a large enough area of manually opening windows or powered window actuators. Any opening mechanisms must be easily accessible and provide adequate user-control over air flow rates to avoid draughts.

The remaining credit criteria requirements are varied, and some are applicable only in one building type. For further details, refer to the particular BREEAM Assessor manual, depending on building type. See also NBS and BREEAM for more information.

5.5 Materials specification (major building elements)

The BREEAM models award credits in recognition of, and to encourage the use of, construction materials with a low environmental impact over the full life cycle of the building.

Windows are one of the six major building elements that are awarded points in the BRE 'Green Guide to Specification' online. The number of points allocated is dependent upon the specification of materials used to form the element and their environmental impact. Ratings range from A+ (the lowest overall environmental impact) to E (the greatest overall environmental impact). These ratings, when entered into a BREEAM calculation tool, are converted into points – the lowest overall environmental impact (i.e. A+) gaining the highest points, whilst a D is awarded 0.25 points and an E zero points.

The points total relating to the six major building elements, i.e. external walls, windows, roofs, upper floor slabs, internal walls, and floor finishes/ coverings are then converted into credits.

When specifying windows, it is important to note that the greatest impact to the environment is caused via heat loss – this is reflected within the BREEAM models, where a significantly larger number of credits available for reducing CO_2 emissions compared with credits available for materials specification.

For further details, refer to BRE 'Green Guide to Specification' online and to the particular BREEAM Assessor manual, depending on building type. See also NBS and BREEAM for more information.

6 Contractual arrangements

6.1 Subcontracting

The specifier may choose a subcontractor or influence the choice of subcontractor in several different ways. See Preliminaries section A30.

6.2 Requirements for submission of information

The specifier may require the Contractor or a subcontractor to submit drawings or other technical information. See Preliminaries section A31.

Table 1 Exposure categories as defined in BS 6375-1

Exposure category/ Design wind load (Pa)	Air permeability		Watertightness		Resistance to wind			
	Class	Maximum test pressure (Pa)	Class	Maximum test pressure (Pa)	Class	P1 (Pa)	P2 (Pa)	P3 (Pa)
800	2	300	3A	100	A2	800	400	1200
1200	2	300	3A	100	A3	1200	600	1800
1600	2	300	5A	200	A4	1600	800	2400
2000	2	300	5A	200	A5	2000	1000	3000
2000+ Pa	2	300	7A	300	AE	(xxxx)	(xxxx) x 0.5	(xxxx) x 1.5
Note: Specimens tested with wind load above Class 5 are classified Class E xxxx – where xxxx is the actual test pressure, P1 (e.g. when P1 = 2350 Pa, this is classified as Class E 2350).								

Guidance notes

115
For guidance on specifying wood responsibly, see section G20, general guidance 10.

Adapt and/ or extend the clause to meet project specific requirements – particularly for Public Sector contracts.

To avoid repetition, where wood or wood-based products are specified in several sections, insert clause 115 in Preliminaries section A33.

120
Use this clause only where it is impractical to make proper allowance for tolerances in design, and where the construction programme is likely to allow sufficient time.

140
If prototypes are needed it is advisable to have them made up before going to tender. Any alterations to the design or construction can then be incorporated beforehand, thereby reducing the possibility of variations later in the contract.

Designated items: Insert, e.g. *Purpose made glazed screen, as clause 510.*

150
Use this clause and clauses 155 and 160 where the selection of windows, their orientation within the building and their size is the responsibility of the contractor and the completed scheme is to be assessed under one of the BREEAM models.

The windows in this section may need to be considered in conjunction with means of daylight provision in other sections, e.g.

- H10 Patent glazing.
- H11 Curtain walling.
- H13 Structural glass assemblies.

BREEAM requirements: See general guidance 5.1. Several BREEAM models award credits where the provision of daylight has been designed in accordance with the guidance in CIBSE Lighting guide 10 'Daylighting and window design' and BS 8206-2. In addition, calculations are required demonstrating a range of criteria including: combinations of daylight factors, uniformity ratios, the opportunity to see the sky when seated at a 0.7 m high desk, and room depth.

Use of a daylight performance schedule may be a convenient method of recording and submitting information and calculations

Specification clauses

L10 WINDOWS/ ROOFLIGHTS/ SCREENS/ LOUVRES
To be read with Preliminaries/ General conditions.

General

110 Evidence of performance
- Certification: Provide independently certified evidence that all incorporated components comply with specified performance requirements.

115 Timber procurement
- Timber (including timber for wood-based products): Obtained from well managed forests and/ or plantations in accordance with:
  - The laws governing forest management in the producer country or countries.
  - International agreements such as the Convention on International Trade in Endangered Species of wild fauna and flora (CITES).
- Documentation: Provide either:
  - Documentary evidence (which has been or can be independently verified) regarding the provenance of all timber supplied.
  - Evidence that suppliers have adopted and are implementing a formal environmental purchasing policy for timber and wood-based products.

120 Site dimensions
- Procedure: Before starting work on designated items take site dimensions, record on shop drawings and use to ensure accurate fabrication.
- Designated items: . . . . . .

140 Control samples
- Procedure:
  - Finalise component details.
  - Fabricate one of each of the following designated items as part of the quantity required for the project.
  - Obtain approval of appearance and quality before proceeding with manufacturer of the remaining quantity.
- Designated items: . . . . . .

150 Daylight performance
- Daylight calculations: In accordance with BS 8206-2 and CIBSE 'Lighting guide LG10'.
- BREEAM requirements:
  - Submit: . . . . . .

many
Daylight performance schedule
Design plans for each floor in the building with each room/ area labelled for use
Design plans for each floor in the building with each room/ area showing isolux contours indicating point daylight factor values
Confirmation that at least 80% of any room that complies with the average daylight factor requirement gives a view of sky from a seat at a 0.7 m high desk

  - Calculations showing: . . . . . .

many
Average daylight factor expressed as a percentage for each room/ area
Average daylight factor expressed as a percentage of the total

necessary to satisfy the credit criteria.
Compliance requirements differ between building types.
– **Submit**: Insert, e.g.
Design plans for each floor in the building with each room/ area labelled for use.
Design plans for each floor in the building with each room/ area showing isolux contours indicating point daylight factor values.
Confirmation that at least 80% of any room that complies with the average daylight factor requirement gives a view of sky from a seat at a 0.7 m high desk.
– **Calculations showing:** Insert requirement for calculations, e.g. for offices, insert:
Average daylight factor expressed as a percentage of the net lettable office floor area.
Minimum point daylight factor expressed as a percentage for each room/ area.
Room depth criterion for each room/ area.

occupied space
Average daylight factor expressed as a percentage of the total net lettable office floor area
Minimum point daylight factor expressed as a percentage for each room/ area
Uniformity ratio for each room/ area
Room depth criterion for each room/ area

155
Use this clause and clauses 150 and 160 where the selection of windows, their orientation within the building and their size is the responsibility of the contractor and the completed scheme is to be assessed under one of the BREEAM models.
The windows in this section may need to be considered in conjunction with other forms of openings providing a view out, e.g.
• H10 Patent glazing.
• H11 Curtain walling.
• H13 Structural glass assemblies.
See general guidance 5.2.

155 View out
• Windows/ opening sizes and position: Design to meet BREEAM 'View out' criteria for relevant building type.
• Submit design plan and elevation drawings showing the following:
– All BREEAM defined 'relevant areas' dependent on building type and room depths.
– Actual or notional workstation/ desk layouts.
– Window/ open areas.
• Submit site plan showing: Building location and proximity to external obstructions.

160
Use this clause and clauses 150 and 155 where the selection of windows, their orientation within the building and their size is the responsibility of the contractor and the completed scheme is to be assessed under one of the BREEAM models.
See general guidance 5.4.
Submit design plan and elevation drawings: Insert requirements dependent upon the ventilation strategy to be used, e.g. for natural ventilation in an office building, insert:
Room depths.
Gross internal floor area of each occupied space.
Locations of openings.
Types of windows/ ventilators.
Total openable areas.
Types and degree of user-controls.

Other reference(s) cited:
CIBSE AM10.

160 Potential for natural ventilation
• Submit design plan and elevation drawings, and calculations confirming the following: . . . . . .
many
A copy of the results from a software modelling tool recommended in CIBSE AM10
Room depths
Gross internal floor area of each occupied space
Locations of openings
Types of windows/ ventilators and total openable areas
Types and degree of user-controls

Products

205
Use this clause where the selection of materials for windows is the responsibility of the contractor and the completed scheme is to be assessed under one of the BREEAM models. See general guidance 5.5.
Minimum rating: Insert from A+, A, B, C, D, E or, e.g. *Contractor's choice.*

Other reference(s) cited:
BRE 'Green Guide to Specification' online.

205 Window materials specification
• Minimum BRE 'Green Guide to Specification' online rating: . . . . . .
A+
A
B
C
D
E
Contractor's choice

Submit proposals

210

Use this clause to specify by proprietary reference. Use clause 250 or 260 to specify by performance, based on British Standards. The types of window, e.g. horizontal pivot, should be shown on drawings.

Species: Ensure that a suitable preservative treatment is offered as standard for species of low natural durability – see BS 644, clause 5.1.2.

Finish as delivered: BS 644 advises that, where practicable, the full finishing system should be applied before delivery and installation. Where this is specified, extra care will be required during installation of finished components into prepared openings (building in is not recommended).

Where the windows are to be supplied primed for painting or sealed to receive a staining system, the priming/ sealing may be either:

- Included as part of the window manufacturer's standard specification – in this case, insert, e.g. *Manufacturer's primer* and specify site painting accordingly in section M60, or
- Specified as part of the overall painting system in section M60 – give the relevant cross reference here, e.g. *Prepared and primed as section M60*.

Windows to receive a stain finish should have at least one coat of wood stain applied off site in addition to any basecoats specified.

Ensure that factory applied coatings offered as standard are of good quality. Paint primers, both solvent and water borne, should comply with BS 7956.

For further guidance, see BRE Digest 422.

Glazing details: Use this item to state:

- Whether factory glazing is required and, if so, the type and thickness of glass (see general guidance to section L40, and BS 952-1. Hermetically sealed glazing units should comply with all parts of BS EN 1279. See BS EN 1279-1, -2, -3, -4, -5 and -6.
- Bead fixing method – screw on or pinned.

Specify site glazing in section L40.

Ironmongery/ Accessories: BS 644, Annex B.2.4 specifies suitable materials and finishes for hardware and fixings. Many window ranges are supplied complete with all necessary hardware. Use this item to describe components supplied as standard and any variations or extras, e.g. different hinge type, locks, ventilators. Only include items to be supplied by the window manufacturer. Specify components to be supplied and fitted by others in section P21. Weatherstripping, where fitted as standard, need not be listed.

Fixing: See clause 780. Insert, e.g.

Screwed to timber framing.

Built in with cramps.

210 Wood windows

- Manufacturer: . . . . . .

Contractor's choice

Submit proposals

– Product reference: . . . . . .

Contractor's choice

Submit proposals

- Species: . . . . . .

Softwood

Douglas fir

Redwood

Whitewood

Hardwood

- Finish as delivered: . . . . . .

Manufacturer's primer

Manufacturer's primer and undercoat

Manufacturer's full paint system

Manufacturer's basecoat stain

Manufacturer's basecoat stain and first topcoat

Manufacturer's full stain system

Prepared and primed as section M60

- Glazing details: . . . . . .

Insulating glass units incorporating low emissivity glass (en = 0.2), air filled

Insulating glass units incorporating low emissivity glass (en = 0.15), air filled

Insulating glass units incorporating low emissivity glass (en = 0.1), air filled

Insulating glass units incorporating low emissivity glass (en = 0.05), air filled

Insulating glass units incorporating low emissivity glass (en = 0.2), argon filled

Insulating glass units incorporating low emissivity glass (en = 0.1), argon filled

Insulating glass units incorporating low emissivity glass (en = 0.05), argon filled

– Beading: . . . . . .

External

Internal

- Ironmongery/ Accessories: . . . . . .

Casement stay

Espagnolette lock

Espagnolette lock, mushroom head

Extension sill

Handle

Locking handle

Restrictor

Trickle ventilator

Aluminium

Black antique

Brass

Chromium plated

Nylon

Stainless steel

Adhesive glazing tape

Security glazing clips

Security glazing packers

- Fixing: . . . . . .

Built in with cramps

Screwed to timber framing

250, 260

Clauses 250 and 260 specify wood windows manufactured generally to BS 644. Use clause 250 for windows to receive an opaque finish and clause 260 for windows that are to be clear finished. To specify by proprietary reference, use clause 210. The types of window, e.g.

250 Wood windows

- Standard: To BS 644.
- Manufacturer: A firm currently registered under a third party quality assurance scheme.
- Exposure category to BS 6375-1/ Design wind load: . . . . . .

sidehung outward opening, horizontal pivot, should be shown on drawings.

BS 644 is a performance specification for factory assembled windows (windows supplied in kit form for site assembly are not covered). Requirements are specified for materials, profile design, workmanship, glazing, construction, accuracy, security and safety, weathertightness (by reference to the performance categories of BS 6375), and operation and strength performance. Recommendations for the storage, protection, installation and fixing of windows are given in Appendix D.

For guidance on the design of timber windows, see TRADA publication 'Wood windows. Designing for high performance'.

Exposure category: See general guidance 1.2. Insert the actual design wind load if over 2000 Pa.

Timber:

– Species: Insert the name of the required species, selecting from BS EN 942, National Annex NA, table NA1 (softwood) or table NA2 (hardwood) as appropriate. Alternatively leave the choice to the manufacturer and insert, e.g.

Softwood as table NA1.
Hardwood as table NA2.
To approval.

Preservative treatment: See guidance in section Z12. Insert, e.g. *Organic solvent as section Z12 and WPA Commodity Specification C5, Desired service life 30 years.* Include the relevant clauses from Z12 in the specification, where appropriate.

Finish as delivered: BS 644 advises that, where practicable, the full finishing system should be applied before delivery and installation. Where this is specified, extra care will be required during the installation of the finished components into prepared openings (building in is not recommended).

Where the windows are to be supplied primed for painting or sealed to receive a staining system, specify as part of the overall painting system in section M60 and give the relevant cross reference here, e.g. *Prepare and prime as section M60.*

Windows to receive a stain finish should have at least one coat of wood stain applied off site in addition to any basecoats specified.

For further guidance, see BRE Digest 422.

Glazing details: Insert information relevant to manufacturer, e.g.

Site putty glazing by others.
Site glazing by others. Include hardwood beads.

If factory glazing is required, insert, e.g. *Factory glazing, 6 mm float glass with hardwood beads and two part rubberizing compound as clause L40/???*

Ironmongery/ Accessories: Requirements usually vary little from one window to another. The various items are best fixed by the window fabricator to ensure satisfactory operation and performance. Ironmongery and accessories include:

- Hanging devices such as hinges, sliding gear.
- Fastening devices such as catches, bolts, stays, locks, reversing catches, restrictors.
- Miscellaneous items such as window boards, fixing lugs, blinds, ventilators, insect screens, weatherstripping.

BS 644, Annex B.2.4 specifies suitable materials and finishes for hardware and fixings.

List the devices required, stating material and finish where relevant. Alternatively, where proprietary products are to be specified, insert *As section P21*, and include suitable clauses in that section to cover requirements.

Fixing: See clause 780. Insert, e.g. *Bolted to masonry reveal*.

Other reference(s) cited:

BS 6375-1
BS 6375-2
WPA Industrial Wood Preservation. Specification and practice
NBS section L40
NBS section P21.

1200 Pa
1600 Pa
2000 Pa
??? Pa

- Operation and strength characteristics: To BS 6375-2.
- Timber: Generally to BS EN 942.
  - Species: . . . . . .

Softwood as table NA.1
Hardwood as table NA.2
American white oak
Douglas fir
European birch
European redwood
European whitewood
Western hemlock

  - Appearance class: J10 for glazing beads, drip mouldings and the like. J40 or better for all other members.
  - Moisture content on delivery: 12–19%.
- Preservative treatment: . . . . . .

Organic solvent as section Z12 and WPA Commodity Specification C5; Desired service life 30 years

- Finish as delivered: . . . . . .

Full paint system as section M60
Prepared and primed as section M60
Primer and undercoat as section M60

- Glazing details: . . . . . .

Insulating glass units incorporating low emissivity glass (en = 0.2), air filled
Insulating glass units incorporating low emissivity glass (en = 0.15), air filled
Insulating glass units incorporating low emissivity glass (en = 0.1), air filled
Insulating glass units incorporating low emissivity glass (en = 0.05), air filled
Insulating glass units incorporating low emissivity glass (en = 0.2), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.1), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.05), argon filled

  - Beading: . . . . . .

External
Internal

- Ironmongery/ Accessories: . . . . . .

Casement stay
Espagnolette lock
Espagnolette lock, mushroom head
Extension sill
Handle
Locking handle
Restrictor
Trickle ventilator
Aluminium
Black antique
Brass
Chromium plated
Nylon
Stainless steel
Adhesive glazing tape
Security glazing clips
Security glazing packers

- Fixing: . . . . . .

Built in with cramps
Screwed to timber framing

250, 260
Clauses 250 and 260 specify wood windows manufactured generally to BS 644. Use clause 250 for windows to receive an opaque finish and clause 260 for windows that are to be clear finished. To specify by proprietary reference, use clause 210. The types of window, e.g. sidehung outward opening, horizontal pivot, should be shown on drawings.

BS 644 is a performance specification for factory assembled windows (windows supplied in kit form for site assembly are not covered). Requirements are specified for materials, profile design, workmanship, glazing, construction, accuracy, security and safety, weathertightness (by reference to the performance categories of BS 6375), and operation and strength performance. Recommendations for the storage, protection, installation and fixing of windows are given in Appendix D.

For guidance on the design of timber windows, see TRADA publication 'Wood windows. Designing for high performance'.

Exposure category: See general guidance 1.2. Insert the actual design wind load if over 2000 Pa.

Timber:

– Species: Insert the name of the required species, selecting from BS EN 942, National Annex NA, table NA1 (softwood) or table NA2 (hardwood) as appropriate. Alternatively leave the choice to the manufacturer and insert, e.g.

Softwood as table NA1.
Hardwood as table NA2.
To approval.

Preservative treatment: See guidance in section Z12. Insert, e.g. *Organic solvent as section Z12 and WPA Commodity Specification C5, Desired service life 30 years.* Include the relevant clauses from Z12 in the specification, where appropriate.

Finish as delivered: BS 644 advises that, where practicable, the full finishing system should be applied before delivery and installation. Where this is specified, extra care will be required during the installation of the finished components into prepared openings (building in is not recommended).

Where the windows are to be supplied primed for painting or sealed to receive a staining system, specify as part of the overall painting system in section M60 and give the relevant cross reference here, e.g. *Prepare and prime as section M60.*

Windows to receive a stain finish should have at least one coat of wood stain applied off site in addition to any basecoats specified.

For further guidance, see BRE Digest 422.

Glazing details: Insert information relevant to manufacturer, e.g.

Site putty glazing by others.
Site glazing by others. Include hardwood beads.

If factory glazing is required, insert, e.g. *Factory glazing, 6 mm float glass with hardwood beads and two part rubberizing compound as clause L40/???*

Ironmongery/ Accessories: Requirements usually vary little from one window to another. The various items are best fixed by the window fabricator to ensure satisfactory operation and performance. Ironmongery and accessories include:

- Hanging devices such as hinges, sliding gear.
- Fastening devices such as catches, bolts, stays, locks, reversing catches, restrictors.
- Miscellaneous items such as window boards, fixing lugs, blinds, ventilators, insect screens, weatherstripping.

BS 644, Annex B.2.4 specifies suitable materials and finishes for hardware and fixings.

List the devices required, stating material and finish where relevant. Alternatively, where proprietary products are to be specified, insert *As section P21*, and include suitable clauses in that section to cover requirements.

Fixing: See clause 780. Insert, e.g. *Bolted to masonry reveal*.

Other reference(s) cited:

BS 6375-1
BS 6375-2
WPA Industrial Wood Preservation. Specification and practice

260 Wood windows

- Standard: To BS 644.
- Manufacturer: A firm currently registered under a third party quality assurance scheme.
- Exposure category to BS 6375-1/ Design wind load: . . . . . .

1200 Pa
1600 Pa
2000 Pa
??? Pa

- Operation and strength characteristics: To BS 6375-2.
- Timber: Generally to BS EN 942.
  - Species: . . . . . .

Softwood as table NA.1
Hardwood as table NA.2
American white oak
Douglas fir
European birch
European redwood
European whitewood
Western hemlock

  - Appearance class: J2 for glazing beads, drip mouldings and the like. J30 or better for all other members. Finger jointing and knots on arrises not permitted where exposed to view.
  - Moisture content on delivery: 12–19%.
- Preservative treatment: . . . . . .

Organic solvent as section Z12 and WPA Commodity Specification C5; Desired service life 30 years

- Finish as delivered: . . . . . .

Basecoat stain as section M60
Basecoat stain and first topcoat as section M60
Full stain system as section M60

- Glazing details: . . . . . .

Insulating glass units incorporating low emissivity glass (en = 0.2), air filled
Insulating glass units incorporating low emissivity glass (en = 0.15), air filled
Insulating glass units incorporating low emissivity glass (en = 0.1), air filled
Insulating glass units incorporating low emissivity glass (en = 0.05), air filled
Insulating glass units incorporating low emissivity glass (en = 0.2), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.1), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.05), argon filled

  - Beading: . . . . . .

External
Internal

- Ironmongery/ Accessories: . . . . . .

Casement stay
Espagnolette lock
Espagnolette lock, mushroom head
Extension sill
Handle
Locking handle
Restrictor
Trickle ventilator
Aluminium
Black antique
Brass
Chromium plated
Nylon
Stainless steel
Adhesive glazing tape
Security glazing clips
Security glazing packers

- Fixing: . . . . . .

Built in with cramps
Screwed to timber framing

NBS section L40
NBS section P21.

310, 315
Use clause 310 to specify by proprietary reference. Use clause 315 to specify by performance. The types of window, e.g. side hung outward opening, horizontal pivot, should be shown on drawings.
Manufacturer (clause 310):
– Product reference: Where thermally improved frames are specified, ensure that manufacturer's reference makes this clear, otherwise insert requirements here, e.g. *W123 with thermal break.*
Standard (clause 315): BS 6510 specifies requirements for the design, fabrication and performance of steel framed windows factory made from hot rolled or cold formed profiles, as single or multi light units or coupled assemblies. It does not cover windows in which any frame member is longer than 3.0 m or kits despatched in bar form for assembly into frames on site.
– Material (clause 315): BS 6510 allows the use of hot rolled carbon steel, cold formed carbon steel or cold formed zinc-coated steel strip.
– Window section: The current version of BS 6510 does not refer to specific frame sections. However manufacturers and all members of the Steel Window Association (SWA) produce windows compliant with the requirements of the current standard, using sections listed in the previous (withdrawn) version. Refer to manufacturer and insert, e.g. *F*, *W20*, *W40*. For further information, contact the Steel Window Association.
Exposure category (clause 315): See general guidance 1.2. BS 6510 requires the completed window to be not less than exposure category 1200. Insert the actual design wind load if over 2000 Pa.
Finish as delivered: BS 6510 requires frames and ancillary profiles to be rust protected using one of the following methods (updated versions of standards cited in BS 6510 are given here):
- Hot dip galvanizing to BS EN ISO 1461 after fabrication.
- Hot dip galvanizing, coating mass 200 or 275 g/m², before cold forming.
- Hot melt zinc spraying to BS EN ISO 2063.
- Stoved epoxy zinc priming to BS EN ISO 12944-5 suitable for moderate environments and over coated with a colour finish.

Windows may be specified with a factory applied powder coating. Window manufacturers usually offer a standard range of colours. Insert, e.g. *RAL 5015 Sky blue Powdakote*.

Where the specifier is able to choose nonstandard colours or alternative powder coating materials, these may be specified by reference to section Z31. Z31, general guidance 6 gives advice on how to amend and extend the clauses given here to include details of surface finish, film thickness, etc.

Alternatively, the windows may be painted on site, in which case insert *Galvanized to BS EN ISO 1461* and specify the painting system in section M60.
Glazing details: Specify site glazing in section L40. Even if the glazing is to be done on site it will still be necessary to state here information needed by the component manufacturer. Use this item when a choice is available or there are particular requirements, e.g.
- Special preparation of rebates.
- Provision of cleats.
- Beads fixed internally or externally.
- Bead fixing: clip on, screw on.
- Screw on beads: hollow or solid.
- Bead material: usually of the same material as the frame although aluminium beads can also be used.
- Provision for double glazing.

Check the availability of any options with the manufacturer before specifying. Insert *As supplied* if the glazing method is not a variable feature of a standard component.
Ironmongery/ Accessories (clause 310): Many window ranges are supplied complete with all necessary hardware. Use this item to describe components supplied as standard and any variations or extras. Only include items to be supplied by the window manufacturer.

310 Steel windows
- Manufacturer: . . . . . .

Contractor's choice
Submit proposals
– Product reference: . . . . . .

Contractor's choice
Submit proposals
- Finish as delivered: . . . . . .

Galvanized
Polyester powder coated
- Glazing details: . . . . . .

Insulating glass units incorporating low emissivity glass (en = 0.2), air filled
Insulating glass units incorporating low emissivity glass (en = 0.15), air filled
Insulating glass units incorporating low emissivity glass (en = 0.1), air filled
Insulating glass units incorporating low emissivity glass (en = 0.05), air filled
Insulating glass units incorporating low emissivity glass (en = 0.2), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.1), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.05), argon filled
Internal galvanized steel screw on beads
– Beading: . . . . . .

External
Internal
- Ironmongery/ Accessories: . . . . . .

Casement stay
Extension sill
Handle
Locking handle
Horizontal friction pivot
Lintel weatherbar
Night latch
Pressed steel sill and window board
Restrictor
Trickle ventilator
Adhesive glazing tape
Security glazing clips
Security glazing packers
- Fixing: . . . . . .

Built in
Screwed to unrebated brick reveal

Components to be supplied and fitted by others should be specified in section P21.
Ironmongery/ Accessories (clause 315): The hardware specified in BS 6510 is the minimum that is required. Additional hardware may be needed to meet a particular requirement, e.g. security.
Windows may be supplied with sills and window boards. These are manufactured in four standard sizes to suit 57 mm and 109 mm set backs from both fairfaced and rendered brickwork.
List devices required, stating material and finish where relevant, e.g. Horizontal friction pivots, CP night latch, Airway type DC ventilator, lintel weatherbar, pressed steel sill and window board.
Alternatively, where proprietary products are to be specified, insert *As section P21*, and include suitable clauses in that section to cover requirements.
Fixing: See clause 781. Insert, e.g.
Built in.
Screwed to unrebated brick reveal.

Other reference(s) cited:
BS 6375-1
BS 6375-2.

310, 315
Use clause 310 to specify by proprietary reference. Use clause 315 to specify by performance. The types of window, e.g. side hung outward opening, horizontal pivot, should be shown on drawings.
Manufacturer (clause 310):
– Product reference: Where thermally improved frames are specified, ensure that manufacturer's reference makes this clear, otherwise insert requirements here, e.g. *W123 with thermal break.*
Standard (clause 315): BS 6510 specifies requirements for the design, fabrication and performance of steel framed windows factory made from hot rolled or cold formed profiles, as single or multi light units or coupled assemblies. It does not cover windows in which any frame member is longer than 3.0 m or kits despatched in bar form for assembly into frames on site.
– Material (clause 315): BS 6510 allows the use of hot rolled carbon steel, cold formed carbon steel or cold formed zinc-coated steel strip.
– Window section: The current version of BS 6510 does not refer to specific frame sections. However manufacturers and all members of the Steel Window Association (SWA) produce windows compliant with the requirements of the current standard, using sections listed in the previous (withdrawn) version. Refer to manufacturer and insert, e.g. *F*, *W20*, *W40*. For further information, contact the Steel Window Association.
Exposure category (clause 315): See general guidance 1.2. BS 6510 requires the completed window to be not less than exposure category 1200. Insert the actual design wind load if over 2000 Pa.
Finish as delivered: BS 6510 requires frames and ancillary profiles to be rust protected using one of the following methods (updated versions of standards cited in BS 6510 are given here):
- Hot dip galvanizing to BS EN ISO 1461 after fabrication.
- Hot dip galvanizing, coating mass 200 or 275 g/m², before cold forming.
- Hot melt zinc spraying to BS EN ISO 2063.
- Stoved epoxy zinc priming to BS EN ISO 12944-5 suitable for moderate environments and over coated with a colour finish.

Windows may be specified with a factory applied powder coating. Window manufacturers usually offer a standard range of colours. Insert, e.g. *RAL 5015 Sky blue Powdakote*.
Where the specifier is able to choose nonstandard colours or alternative powder coating materials, these may be specified by reference to section Z31. Z31, general guidance 6 gives advice on how to amend and extend the clauses given here to include details of surface finish, film thickness, etc.
Alternatively, the windows may be painted on site, in which case insert *Galvanized to BS EN ISO 1461* and specify the painting system

315 Steel windows
- Standard: To BS 6510.
  – Material: . . . . . .

Hot rolled carbon steel
Cold formed carbon steel
Cold formed zinc-coated steel strip

  – Window section: . . . . . .

SMW (F range profile)
F
W20
W40

- Exposure category to BS 6375-1/ Design wind load: . . . . . .

1200 Pa
1600 Pa
2000 Pa
??? Pa

- Operation and strength characteristics: To BS 6375-2.
- Finish as delivered: . . . . . .

Galvanized
Polyester powder coated

- Glazing details: . . . . . .

Insulating glass units incorporating low emissivity glass (en = 0.2), air filled
Insulating glass units incorporating low emissivity glass (en = 0.15), air filled
Insulating glass units incorporating low emissivity glass (en = 0.1), air filled
Insulating glass units incorporating low emissivity glass (en = 0.05), air filled
Insulating glass units incorporating low emissivity glass (en = 0.2), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.1), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.05), argon filled
Internal galvanized steel screw on beads

  – Beading: . . . . . .

External
Internal

- Ironmongery/ Accessories: . . . . . .

Casement stay
Espagnolette lock, mushroom head
Extension sill
Handle
Locking handle

in section M60.
Glazing details: Specify site glazing in section L40. Even if the glazing is to be done on site it will still be necessary to state here information needed by the component manufacturer. Use this item when a choice is available or there are particular requirements, e.g.
- Special preparation of rebates.
- Provision of cleats.
- Beads fixed internally or externally.
- Bead fixing: clip on, screw on.
- Screw on beads: hollow or solid.
- Bead material: usually of the same material as the frame although aluminium beads can also be used.
- Provision for double glazing.

Check the availability of any options with the manufacturer before specifying. Insert *As supplied* if the glazing method is not a variable feature of a standard component.
Ironmongery/ Accessories (clause 310): Many window ranges are supplied complete with all necessary hardware. Use this item to describe components supplied as standard and any variations or extras. Only include items to be supplied by the window manufacturer. Components to be supplied and fitted by others should be specified in section P21.
Ironmongery/ Accessories (clause 315): The hardware specified in BS 6510 is the minimum that is required. Additional hardware may be needed to meet a particular requirement, e.g. security.
Windows may be supplied with sills and window boards. These are manufactured in four standard sizes to suit 57 mm and 109 mm set backs from both fairfaced and rendered brickwork.
List devices required, stating material and finish where relevant, e.g. Horizontal friction pivots, CP night latch, Airway type DC ventilator, lintel weatherbar, pressed steel sill and window board.
Alternatively, where proprietary products are to be specified, insert *As section P21*, and include suitable clauses in that section to cover requirements.
Fixing: See clause 781. Insert, e.g.
Built in.
Screwed to unrebated brick reveal.

Other reference(s) cited:
BS 6375-1
BS 6375-2.

Horizontal friction pivot
Lintel weatherbar
Night latch
Pressed steel sill and window board
Restrictor
Trickle ventilator
Adhesive glazing tape
Security glazing clips
Security glazing packers
- Fixing: . . . . . .

Built in
Screwed to unrebated brick reveal

330, 335
Use clause 330 to specify by proprietary reference. Use clause 335 to specify by performance. The types of window, e.g. side hung outward opening, horizontal pivot, should be shown on drawings.
BS 4873 specifies requirements for the design, construction and performance of aluminium alloy windows intended to be installed vertically (±15°), including materials and glazing. Replacement windows and thermally improved frames are included. The standard excludes:
- Windows with any frame member longer than 3 m.
- Fixed louvres.
- Secondary windows.
- Windows with frames designed for bullet resistant or antibandit glazing.

For design guidance and good practice advice on the assessment and selection of aluminium alloy windows, see Council for Aluminium in Building (CAB) publication 'Aluminium windows. A guide to specification and design'.
Manufacturer (clause 330):
– Product reference: Where thermally improved frames are specified, ensure that manufacturer's reference makes this clear, otherwise insert requirement here, e.g. *W456 with thermal break.*
Exposure category (clause 335): See general guidance 1.2. Insert the actual design wind pressure if over 2000 Pa.
Thermal improvement (clause 335): Frames can be thermally improved by the inclusion of an insulating barrier or cladding – see BS

330 Aluminium windows
- Manufacturer: . . . . . .

Contractor's choice
Submit proposals
– Product reference: . . . . . .
Contractor's choice
Submit proposals
- Finish as delivered: . . . . . .

Bronze anodized; matt finish
??? anodized, ??? finish
Liquid organic coating
Polyester powder coating
- Glazing details: . . . . . .

Insulating glass units incorporating low emissivity glass (en = 0.2), air filled
Insulating glass units incorporating low emissivity glass (en = 0.15), air filled
Insulating glass units incorporating low emissivity glass (en = 0.1), air filled
Insulating glass units incorporating low emissivity glass (en = 0.05), air filled
Insulating glass units incorporating low emissivity glass (en = 0.2), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.1), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.05),

4873, Annex B.2.1. Insert specific requirements, or *Required* or *Not required*, as appropriate.
Finish as delivered: BS 4873 requires aluminium windows to be finished by:
- Anodizing to BS 3987: Insert, e.g. *Bronze anodized; Finish: Matt.*
- Liquid organic coating to BS 4842: Insert, e.g. *BS 04D44 Rust Red Organikote.*
- Powder coating to BS 6496: Insert, e.g. *RAL 6002 Grass green Polypowdakote.*

BS 3987 requires a minimum average anodic oxidation coating thickness of 25 micrometres. This should be suitable for all but the most highly polluted environments or severe industrial/ marine situation. A thicker coating can be specified, but excessively thick films can give unsatisfactory weathering performance. See also section Z11, general guidance 2.3.

Window manufacturers usually offer a standard range of colours for factory applied powder coatings. Where the specifier is able to choose nonstandard colours or alternative powder coating materials, these may be specified by reference to section Z31. Z31, general guidance 6, gives advice on how to amend and extend the clauses given here to include details of surface finish, film thickness, etc.
Glazing details: Specify site glazing in section L40. Even if the glazing is to be done on site it will still be necessary to state here information needed by the component manufacturer.

Use this item when a choice is available or there are particular requirements, e.g.
- Type of glass (preglazed windows and doors only).
- Special preparation of rebates.
- Provision of cleats.
- Beads fixed internally or externally.
- Bead fixing: Clip on, screw on.
- Screw on beads: Hollow or solid.
- Bead material: Usually of the same material as the frame.
- Provision for double glazing.

Check the availability of any options with the manufacturer before specifying. Insert *As supplied* if the glazing method is not a variable feature of a standard component.

Insert, e.g. *Site double glazing by others*. Provide internal beads. If factory glazing is required insert, e.g. *Factory glazing, 6 mm float glass with internal beads and two-part rubberizing compound as clause L40/???*
Ironmongery/ Accessories (clause 330): Many window ranges are supplied complete with all necessary hardware. Use this item to describe components supplied as standard and any variations or extras. Only include items to be supplied by the window manufacturer. Components to be supplied and fixed by others should be specified in section P21.
Ironmongery/ Accessories (clause 335): List the devices required, stating material and finish where relevant.

Alternatively, where proprietary products are to be specified, insert *As section P21*, and include suitable clauses in that section to cover requirements.
Fixing: See clause 782. Insert, e.g. *Screwed to masonry reveal.*

Other reference(s) cited:
BS 6375-1.

330, 335
Use clause 330 to specify by proprietary reference. Use clause 335 to specify by performance. The types of window, e.g. side hung outward opening, horizontal pivot, should be shown on drawings.

BS 4873 specifies requirements for the design, construction and performance of aluminium alloy windows intended to be installed vertically (±15°), including materials and glazing. Replacement windows and thermally improved frames are included. The standard excludes:
- Windows with any frame member longer than 3 m.
- Fixed louvres.

argon filled
– Beading: . . . . . .
External
Internal
- Ironmongery/ Accessories: . . . . . .

Casement stay
Espagnolette lock
Espagnolette lock, mushroom head
Extension sill
Handle
Locking handle
Horizontal friction pivot
Restrictor
Trickle ventilator
Adhesive glazing tape
Security glazing clips
Security glazing packers
- Fixing: . . . . . .

Screwed to masonry reveal

335 Aluminium windows
- Standard: To BS 4873.
- Exposure category to BS 6375-1/ Design wind load: . . . . . .

1200 Pa
1600 Pa
2000 Pa
??? Pa
- Thermal improvement: . . . . . .

Required
Not required
- Finish as delivered: . . . . . .

- Secondary windows.
- Windows with frames designed for bullet resistant or antibandit glazing.

For design guidance and good practice advice on the assessment and selection of aluminium alloy windows, see Council for Aluminium in Building (CAB) publication 'Aluminium windows. A guide to specification and design'.

Manufacturer (clause 330):

– Product reference: Where thermally improved frames are specified, ensure that manufacturer's reference makes this clear, otherwise insert requirement here, e.g. *W456 with thermal break.*

Exposure category (clause 335): See general guidance 1.2. Insert the actual design wind pressure if over 2000 Pa.

Thermal improvement (clause 335): Frames can be thermally improved by the inclusion of an insulating barrier or cladding – see BS 4873, Annex B.2.1. Insert specific requirements, or *Required* or *Not required*, as appropriate.

Finish as delivered: BS 4873 requires aluminium windows to be finished by:

- Anodizing to BS 3987: Insert, e.g. *Bronze anodized; Finish: Matt.*
- Liquid organic coating to BS 4842: Insert, e.g. *BS 04D44 Rust Red Organikote.*
- Powder coating to BS 6496: Insert, e.g. *RAL 6002 Grass green Polypowdakote.*

BS 3987 requires a minimum average anodic oxidation coating thickness of 25 micrometres. This should be suitable for all but the most highly polluted environments or severe industrial/ marine situation. A thicker coating can be specified, but excessively thick films can give unsatisfactory weathering performance. See also section Z11, general guidance 2.3.

Window manufacturers usually offer a standard range of colours for factory applied powder coatings. Where the specifier is able to choose nonstandard colours or alternative powder coating materials, these may be specified by reference to section Z31. Z31, general guidance 6, gives advice on how to amend and extend the clauses given here to include details of surface finish, film thickness, etc.

Glazing details: Specify site glazing in section L40. Even if the glazing is to be done on site it will still be necessary to state here information needed by the component manufacturer.

Use this item when a choice is available or there are particular requirements, e.g.

- Type of glass (preglazed windows and doors only).
- Special preparation of rebates.
- Provision of cleats.
- Beads fixed internally or externally.
- Bead fixing: Clip on, screw on.
- Screw on beads: Hollow or solid.
- Bead material: Usually of the same material as the frame.
- Provision for double glazing.

Check the availability of any options with the manufacturer before specifying. Insert *As supplied* if the glazing method is not a variable feature of a standard component.

Insert, e.g. *Site double glazing by others*. Provide internal beads. If factory glazing is required insert, e.g. *Factory glazing, 6 mm float glass with internal beads and two-part rubberizing compound as clause L40/???*

Ironmongery/ Accessories (clause 330): Many window ranges are supplied complete with all necessary hardware. Use this item to describe components supplied as standard and any variations or extras. Only include items to be supplied by the window manufacturer. Components to be supplied and fixed by others should be specified in section P21.

Ironmongery/ Accessories (clause 335): List the devices required, stating material and finish where relevant.

Alternatively, where proprietary products are to be specified, insert *As section P21*, and include suitable clauses in that section to cover requirements.

Fixing: See clause 782. Insert, e.g. *Screwed to masonry reveal.*

Other reference(s) cited:

Anodized to BS EN 3987
Liquid organic coating to BS 4842
Polyester powder coating to BS 6496

- Glazing details: . . . . . .

Insulating glass units incorporating low emissivity glass (en = 0.2), air filled
Insulating glass units incorporating low emissivity glass (en = 0.15), air filled
Insulating glass units incorporating low emissivity glass (en = 0.1), air filled
Insulating glass units incorporating low emissivity glass (en = 0.05), air filled
Insulating glass units incorporating low emissivity glass (en = 0.2), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.1), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.05), argon filled

– Beading: . . . . . .

External
Internal

- Ironmongery/ Accessories: . . . . . .

Casement stay
Espagnolette lock
Espagnolette lock, mushroom head
Extension sill
Handle
Locking handle
Horizontal friction pivot
Restrictor
Trickle ventilator
Adhesive glazing tape
Security glazing clips
Security glazing packers

- Fixing: . . . . . .

Screwed to masonry reveal

BS 6375-1.

350, 360, 380
Three clauses are given for PVC-U windows, allowing specification by:
- Proprietary reference (clause 350).
- Performance, based on British Standards (clause 360).
- Performance, based on an Agrément Certificate, supported by British Standards (clause 380).

Alternative clauses are necessary because no one standard covers the whole range of materials or finishes currently used to fabricate PVC-U windows.

BS 7412 applies only to windows with fusion welded corner joints, with frame members not exceeding 3.0 m. It refers to white profiles to BS EN 12608, and surface covered profiles to BS 7722. Windows manufactured to BS 7412 may, in some cases, be marked with the certification trade mark of a third party quality inspection agency, e.g. the BSI Kitemark – see general guidance 3.

PVC-U windows may also be made from self-coloured profiles – either coloured throughout or with an external co-extruded layer, or from surface covered profiles, where special foils are applied to produce coloured and/ or textured (e.g. wood grain) effects. Windows made from these profiles are not covered by British Standards and should be specified either by proprietary reference or, where applicable, using clause 380.

The technique of painting PVC-U frames during manufacture has made a wider choice of colours available. However, the British Plastics Federation advises that painting should only be carried out by suitably qualified coating applicators approved by the PVC-U profile supplier, and it should be noted that such finishes may have a limited life expectancy. At present there is no British or Trade Standard for painted PVC-U windows and in this case, and in other similar situations where there are no relevant standards, it is obviously preferable to specify windows that have been certified by an independent authority, e.g. the British Board of Agrément.

For further guidance on the characteristics of PVC-U windows, see BRE Digest 404.

Exposure category (clauses 360, 380): See general guidance 1.

Where windows are Agrément certified, the certificate gives the maximum size of window up to which a particular performance grading applies.

Reinforcement (clauses 360, 380): BS 7412 allows the use of the following materials in the defined conditions:
- Hot dip zinc-coated carbon steel sheet. For use only in sealed profiles or systems where no moisture can come into contact with the reinforcement.
- Carbon steel sections with a corrosion resistant coating conforming to the same requirements for galvanized sheet reinforcement. For use only in sealed profiles or systems where no moisture can come into contact with the reinforcement.
- Austenitic stainless steel sheet or strip. Can be used in any type of profile or system.
- Extruded aluminium alloy. This type of reinforcement can be used in any type of profile or system.

Glazing details: State whether single or double glazed and any particular requirements for the type/ thickness of glass if to be factory glazed. State if safety and/ or patterned glass is required, noting the position of such glass in the unit build up, and note if units are to be internally or externally beaded. Specify site glazing in section L40.

Ironmongery/ Accessories (clause 350): Many window ranges are supplied complete with all necessary hardware. Use this item to describe components supplied as standard and any variations or extras, e.g. security measures such as security tape or clips. Only include items to be supplied by the window manufacturer. Components to be supplied and fixed by others should be specified in section P21.

Ironmongery/ Accessories (clauses 360, 380): List the items required, including locking, security and safety devices and systems.

350 PVC-U windows
- Manufacturer: . . . . . .

Contractor's choice
Submit proposals
- Product reference: . . . . . .

Contractor's choice
Submit proposals
- Colour/ Texture: . . . . . .

Brown
Light oak
Mahogany
Smooth
White
Wood grain
- Glazing details: . . . . . .

Insulating glass units incorporating low emissivity glass (en = 0.2), air filled
Insulating glass units incorporating low emissivity glass (en = 0.15), air filled
Insulating glass units incorporating low emissivity glass (en = 0.1), air filled
Insulating glass units incorporating low emissivity glass (en = 0.05), air filled
Insulating glass units incorporating low emissivity glass (en = 0.2), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.1), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.05), argon filled
- Beading: . . . . . .

External
Internal
- Ironmongery/ Accessories: . . . . . .

Casement stay
Espagnolette lock
Espagnolette lock, mushroom head
Extension sill
Handle
Locking handle
Horizontal friction pivot
Restrictor
Trickle ventilator
Adhesive glazing tape
Security glazing clips
Security glazing packers
- Fixing: . . . . . .

Lug fixing
Through frame fixing

State material and finish where relevant. It is essential that the manufacturer is notified at an early stage if ventilators are to be provided, so that they can be incorporated in the design of the window.

Where proprietary products are to be specified rather than giving generic descriptions, insert *As section P21* and include suitable clauses in that section to cover requirements.

Fixing: See clause 783. Insert, e.g.

Lug fixing.

Through frame fixing.

Other reference(s) cited:

BS 6375-1

BS 6375-2

BS EN 10346.

350, 360, 380

Three clauses are given for PVC-U windows, allowing specification by:

- Proprietary reference (clause 350).
- Performance, based on British Standards (clause 360).
- Performance, based on an Agrément Certificate, supported by British Standards (clause 380).

Alternative clauses are necessary because no one standard covers the whole range of materials or finishes currently used to fabricate PVC-U windows.

BS 7412 applies only to windows with fusion welded corner joints, with frame members not exceeding 3.0 m. It refers to white profiles to BS EN 12608, and surface covered profiles to BS 7722. Windows manufactured to BS 7412 may, in some cases, be marked with the certification trade mark of a third party quality inspection agency, e.g. the BSI Kitemark – see general guidance 3.

PVC-U windows may also be made from self-coloured profiles – either coloured throughout or with an external co-extruded layer, or from surface covered profiles, where special foils are applied to produce coloured and/ or textured (e.g. wood grain) effects. Windows made from these profiles are not covered by British Standards and should be specified either by proprietary reference or, where applicable, using clause 380.

The technique of painting PVC-U frames during manufacture has made a wider choice of colours available. However, the British Plastics Federation advises that painting should only be carried out by suitably qualified coating applicators approved by the PVC-U profile supplier, and it should be noted that such finishes may have a limited life expectancy. At present there is no British or Trade Standard for painted PVC-U windows and in this case, and in other similar situations where there are no relevant standards, it is obviously preferable to specify windows that have been certified by an independent authority, e.g. the British Board of Agrément.

For further guidance on the characteristics of PVC-U windows, see BRE Digest 404.

Exposure category (clauses 360, 380): See general guidance 1.

Where windows are Agrément certified, the certificate gives the maximum size of window up to which a particular performance grading applies.

Reinforcement (clauses 360, 380): BS 7412 allows the use of the following materials in the defined conditions:

- Hot dip zinc-coated carbon steel sheet. For use only in sealed profiles or systems where no moisture can come into contact with the reinforcement.
- Carbon steel sections with a corrosion resistant coating conforming to the same requirements for galvanized sheet reinforcement. For use only in sealed profiles or systems where no moisture can come into contact with the reinforcement.
- Austenitic stainless steel sheet or strip. Can be used in any type of profile or system.
- Extruded aluminium alloy. This type of reinforcement can be used in any type of profile or system.

360 PVC-U windows

- Standard:
  - Manufacture: To BS 7412.
    Manufacturer: A firm currently registered under a quality assurance scheme operated by a certification and inspection body accredited by the United Kingdom Accreditation Service (UKAS).
  - Profile: . . . . . .

Not applicable
To BS 7722
To BS EN 12608

- Colour/ Texture: . . . . . .

Brown
Light oak
Mahogany
Smooth
White
Wood grain

- Exposure category to BS 6375-1/ Design wind load: . . . . . .

1200 Pa
1600 Pa
2000 Pa
??? Pa

- Reinforcement: . . . . . .

Austenitic stainless steel
Extruded aluminium alloy
Carbon steel sheet, hot dip zinc-coated conforming to BS EN 10346
Carbon steel sections with corrosion resistant coating matching requirements of hot dip zinc-coated conforming to BS EN 10346

- Glazing details: . . . . . .

Insulating glass units incorporating low emissivity glass (en = 0.2), air filled
Insulating glass units incorporating low emissivity glass (en = 0.15), air filled
Insulating glass units incorporating low emissivity glass (en = 0.1), air filled
Insulating glass units incorporating low emissivity glass (en = 0.05), air filled
Insulating glass units incorporating low emissivity glass (en = 0.2), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.1), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.05), argon filled

  - Beading: . . . . . .

External
Internal

- Ironmongery/ Accessories: . . . . . .

Casement stay
Espagnolette lock
Espagnolette lock, mushroom head
Extension sill

Glazing details: State whether single or double glazed and any particular requirements for the type/ thickness of glass if to be factory glazed. State if safety and/ or patterned glass is required, noting the position of such glass in the unit build up, and note if units are to be internally or externally beaded. Specify site glazing in section L40.
Ironmongery/ Accessories (clause 350): Many window ranges are supplied complete with all necessary hardware. Use this item to describe components supplied as standard and any variations or extras, e.g. security measures such as security tape or clips. Only include items to be supplied by the window manufacturer. Components to be supplied and fixed by others should be specified in section P21.
Ironmongery/ Accessories (clauses 360, 380): List the items required, including locking, security and safety devices and systems. State material and finish where relevant. It is essential that the manufacturer is notified at an early stage if ventilators are to be provided, so that they can be incorporated in the design of the window.
Where proprietary products are to be specified rather than giving generic descriptions, insert *As section P21* and include suitable clauses in that section to cover requirements.
Fixing: See clause 783. Insert, e.g.
Lug fixing.
Through frame fixing.

Other reference(s) cited:
BS 6375-1
BS 6375-2
BS EN 10346.

Handle
Locking handle
Horizontal friction pivot
Restrictor
Trickle ventilator
Adhesive glazing tape
Security glazing clips
Security glazing packers
- Fixing: . . . . . .

Lug fixing
Through frame fixing

350, 360, 380
Three clauses are given for PVC-U windows, allowing specification by:
- Proprietary reference (clause 350).
- Performance, based on British Standards (clause 360).
- Performance, based on an Agrément Certificate, supported by British Standards (clause 380).

Alternative clauses are necessary because no one standard covers the whole range of materials or finishes currently used to fabricate PVC-U windows.
BS 7412 applies only to windows with fusion welded corner joints, with frame members not exceeding 3.0 m. It refers to white profiles to BS EN 12608, and surface covered profiles to BS 7722. Windows manufactured to BS 7412 may, in some cases, be marked with the certification trade mark of a third party quality inspection agency, e.g. the BSI Kitemark – see general guidance 3.
PVC-U windows may also be made from self-coloured profiles – either coloured throughout or with an external co-extruded layer, or from surface covered profiles, where special foils are applied to produce coloured and/ or textured (e.g. wood grain) effects. Windows made from these profiles are not covered by British Standards and should be specified either by proprietary reference or, where applicable, using clause 380.
The technique of painting PVC-U frames during manufacture has made a wider choice of colours available. However, the British Plastics Federation advises that painting should only be carried out by suitably qualified coating applicators approved by the PVC-U profile supplier, and it should be noted that such finishes may have a limited life expectancy. At present there is no British or Trade Standard for painted PVC-U windows and in this case, and in other similar situations where there are no relevant standards, it is obviously preferable to specify windows that have been certified by an independent authority, e.g. the British Board of Agrément.
For further guidance on the characteristics of PVC-U windows, see BRE Digest 404.
Exposure category (clauses 360, 380): See general guidance 1.
Where windows are Agrément certified, the certificate gives the maximum size of window up to which a particular performance

380 PVC-U windows
- Standard: Agrément certified.
- Colour/ Texture: . . . . . .

Brown
Light oak
Mahogany
Smooth
White
Wood grain
- Exposure category to BS 6375-1/ Design wind load: . . . . . .

1200 Pa
1600 Pa
2000 Pa
??? Pa
- Operation and strength characteristics: To BS 6375-2.
- Reinforcement: . . . . . .

Austenitic stainless steel
Extruded aluminium alloy
Carbon steel sheet, hot dip zinc-coated conforming to BS EN 10346
Carbon steel sections with corrosion resistant coating matching requirements of hot dip zinc-coated conforming to BS EN 10346
- Glazing details: . . . . . .

Insulating glass units incorporating low emissivity glass (en = 0.2), air filled
Insulating glass units incorporating low emissivity glass (en = 0.15), air filled
Insulating glass units incorporating low emissivity glass (en = 0.1), air filled
Insulating glass units incorporating low emissivity glass (en = 0.05), air filled
Insulating glass units incorporating low emissivity glass (en = 0.2), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.1), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.05), argon filled
  – Beading: . . . . . .

External

grading applies.
Reinforcement (clauses 360, 380): BS 7412 allows the use of the following materials in the defined conditions:
- Hot dip zinc-coated carbon steel sheet. For use only in sealed profiles or systems where no moisture can come into contact with the reinforcement.
- Carbon steel sections with a corrosion resistant coating conforming to the same requirements for galvanized sheet reinforcement. For use only in sealed profiles or systems where no moisture can come into contact with the reinforcement.
- Austenitic stainless steel sheet or strip. Can be used in any type of profile or system.
- Extruded aluminium alloy. This type of reinforcement can be used in any type of profile or system.

Glazing details: State whether single or double glazed and any particular requirements for the type/ thickness of glass if to be factory glazed. State if safety and/ or patterned glass is required, noting the position of such glass in the unit build up, and note if units are to be internally or externally beaded. Specify site glazing in section L40.
Ironmongery/ Accessories (clause 350): Many window ranges are supplied complete with all necessary hardware. Use this item to describe components supplied as standard and any variations or extras, e.g. security measures such as security tape or clips. Only include items to be supplied by the window manufacturer. Components to be supplied and fixed by others should be specified in section P21.
Ironmongery/ Accessories (clauses 360, 380): List the items required, including locking, security and safety devices and systems. State material and finish where relevant. It is essential that the manufacturer is notified at an early stage if ventilators are to be provided, so that they can be incorporated in the design of the window.
Where proprietary products are to be specified rather than giving generic descriptions, insert *As section P21* and include suitable clauses in that section to cover requirements.
Fixing: See clause 783. Insert, e.g.
Lug fixing.
Through frame fixing.

Other reference(s) cited:
BS 6375-1
BS 6375-2
BS EN 10346.

Internal
- Ironmongery/ Accessories: . . . . . .

Casement stay
Espagnolette lock
Espagnolette lock, mushroom head
Extension sill
Handle
Locking handle
Horizontal friction pivot
Restrictor
Trickle ventilator
Adhesive glazing tape
Security glazing clips
Security glazing packers
- Fixing: . . . . . .

Lug fixing as
Through frame fixing

390
Use this clause, repeated as necessary, for proprietary windows manufactured from any other material, e.g. stainless steel or bronze.
For help on completing the clause items, see guidance notes to clauses 210–350.
Clause heading: Insert, e.g. *– BRONZE*

390 Proprietary windows . . . . . .
– BRONZE
– STAINLESS STEEL
- Manufacturer: . . . . . .

Contractor's choice
Submit proposals
– Product reference: . . . . . .

Contractor's choice
Submit proposals
- Finish as delivered: . . . . . .
- Glazing details: . . . . . .

Insulating glass units incorporating low emissivity glass (en = 0.2), air filled
Insulating glass units incorporating low emissivity glass (en = 0.15), air filled
Insulating glass units incorporating low emissivity glass (en = 0.1), air filled
Insulating glass units incorporating low emissivity glass (en = 0.05), air filled
Insulating glass units incorporating low emissivity glass (en = 0.2), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.1), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.05),

argon filled
– Beading: . . . . . .
External
Internal
• Ironmongery/ Accessories: . . . . . .
Casement stay
Espagnolette lock
Espagnolette lock, mushroom head
Extension sill
Handle
Locking handle
Restrictor
Trickle ventilator
Aluminium
Black antique
Brass
Chromium plated
Nylon
Stainless steel
Adhesive glazing tape
Security glazing clips
Security glazing packers
• Fixing: . . . . . .
Screw fixing
Lug fixing

400, 410
Use clause 400 to specify by proprietary reference. Use clause 410 to specify by performance. The types of window, e.g. side hung outward opening, horizontal pivot, should be shown on drawings.

Composite windows combine two or more materials to utilize the most beneficial properties of each, for example, the good thermal performance of wood and the long term durability of aluminium. In most cases wood is used for the inner frame and sash.

Alternatively, they may be made from PVC-U profiles. The exterior material may also be plastics, but more commonly the cladding or facing profiles are metal, e.g. aluminium, stainless steel, bronze, brass, copper, etc. In some systems, the metal profile is used to form the complete casement section. Where this is done, a thermal break is usually incorporated to reduce cold bridging and the consequent risk of condensation on the inner surface of the casement.

Clause heading: Insert a brief description of the materials from which the windows will be made, e.g.
– ALUMINIUM CLAD WOOD
– PLASTICS CLAD WOOD

Manufacturer (clause 400):
– Product reference: Where thermally improved frames are specified, ensure that manufacturer's reference makes this clear, otherwise insert requirement here, e.g. *W789 with thermal break.*

Materials: For proprietary specifications, insert requirements where a choice is available. Greater detail will be needed for performance specifications.
– Exterior frame/ sash cladding: Insert, e.g. *Extruded aluminium alloy profiles.*
Finish: Insert e.g. *RAL 7035 Silver grey Polypowdakote.*
– Interior frame/ sash section: Insert, e.g. *European Redwood*. Ensure that a suitable preservative treatment is offered as standard for wood species of low natural durability.
Finish: Sections are usually factory finished with clear lacquer for a natural finish, or with decorative paints or stains. Where finishes other than those offered as standard are required, the manufacturer should be consulted to ensure that they can apply the alternative materials using their existing production methods. Insert, e.g.
Factory finished, clear lacquer.
Factory finished stained, colour to approval.

Thermal improvement (clause 410): Insert specific requirements, or *Required* or *Not required*, as appropriate.

Exposure category (clause 410): See general guidance 1. Insert the actual design wind pressure if over 2000 Pa.

400 Composite windows . . . . . .
– ALUMINIUM CLAD WOOD
– PLASTICS CLAD WOOD
• Manufacturer: . . . . . .
Contractor's choice
Submit proposals
– Product reference: . . . . . .
Contractor's choice
Submit proposals
• Materials:
– Exterior frame/ sash cladding: . . . . . .
Aluminium
Bronze
Extruded PVC-U
Steel
Finish: . . . . . .
Anodized
Matt
Natural
Polished
Polyester powder coated
– Interior frame/ sash section: . . . . . .
Softwood
Hardwood
Douglas fir
European redwood
Finish: . . . . . .
Clear lacquer
Stained, colour to approval
• Glazing details: . . . . . .
Insulating glass units incorporating low emissivity glass (en = 0.2), air filled
Insulating glass units incorporating low emissivity glass (en = 0.15), air filled
Insulating glass units incorporating low emissivity glass (en = 0.1), air filled
Insulating glass units incorporating low emissivity glass (en = 0.05), air filled
Insulating glass units incorporating low emissivity glass (en = 0.2), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.1), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.05),

Glazing details: Composite windows are normally factory glazed. Use this item to state, e.g.
- Type and thickness of glass.
- Requirement for double/ triple glazing.
- Internal or external bead glazing.

The availability of any options should be checked with the manufacturer before specifying.

Site glazing, if required, should be specified in section L40.

Ironmongery/ Accessories (clause 400): Many window ranges are supplied complete with all necessary hardware. Use this item to describe components supplied as standard and any variations or extras. Only include items to be supplied by the window manufacturer. Components to be supplied and fixed by others should be specified in section P21.

Ironmongery/ Accessories (clause 410): Lists hardware required including locking, security and safety devices. State material and finish where relevant. Alternatively, where proprietary products are to be specified, insert *As section P21*, and include suitable clauses in that section to cover requirements.

Fixing: See clause 784. Insert e.g.

Screw fixing.

Lug fixing.

Other reference(s) cited:

BS 6375-1

BS 6375-2.

400, 410

Use clause 400 to specify by proprietary reference. Use clause 410 to specify by performance. The types of window, e.g. side hung outward opening, horizontal pivot, should be shown on drawings.

Composite windows combine two or more materials to utilize the most beneficial properties of each, for example, the good thermal performance of wood and the long term durability of aluminium. In most cases wood is used for the inner frame and sash.

Alternatively, they may be made from PVC-U profiles. The exterior material may also be plastics, but more commonly the cladding or facing profiles are metal, e.g. aluminium, stainless steel, bronze, brass, copper, etc. In some systems, the metal profile is used to form the complete casement section. Where this is done, a thermal break is usually incorporated to reduce cold bridging and the consequent risk of condensation on the inner surface of the casement.

Clause heading: Insert a brief description of the materials from which the windows will be made, e.g.

– ALUMINIUM CLAD WOOD

– PLASTICS CLAD WOOD

Manufacturer (clause 400):

– Product reference: Where thermally improved frames are specified, ensure that manufacturer's reference makes this clear, otherwise insert requirement here, e.g. *W789 with thermal break.*

Materials: For proprietary specifications, insert requirements where a choice is available. Greater detail will be needed for performance specifications.

– Exterior frame/ sash cladding: Insert, e.g. *Extruded aluminium alloy profiles.*

Finish: Insert e.g. *RAL 7035 Silver grey Polypowdakote.*

– Interior frame/ sash section: Insert, e.g. *European Redwood.* Ensure that a suitable preservative treatment is offered as standard for wood species of low natural durability.

Finish: Sections are usually factory finished with clear lacquer for a natural finish, or with decorative paints or stains. Where finishes other than those offered as standard are required, the manufacturer should be consulted to ensure that they can apply the alternative materials using their existing production methods. Insert, e.g.

Factory finished, clear lacquer.

Factory finished stained, colour to approval.

Thermal improvement (clause 410): Insert specific requirements, or *Required* or *Not required*, as appropriate.

argon filled

– Beading: . . . . . .

External

Internal

- Ironmongery/ Accessories: . . . . . .

Casement stay

Espagnolette lock

Espagnolette lock, mushroom head

Extension sill

Handle

Locking handle

Restrictor

Trickle ventilator

Adhesive glazing tape

Security glazing clips

Security glazing packers

- Fixing: . . . . . .

Screw fixing

Lug fixing

410 Composite windows . . . . . .
- Manufacturer: A firm currently registered under a third party quality assurance scheme.
- Materials:

– Exterior frame/ sash cladding: . . . . . .

Bronze profiles

Extruded aluminium alloy profiles

Extruded PVC-U profiles

Steel profiles

Finish: . . . . . .

Anodized

Matt

Natural

Polished

Polyester powder coated

– Interior frame/ sash section: . . . . . .

Softwood

Hardwood

Douglas fir

European redwood

Finish: . . . . . .

Clear lacquer

Stained, colour to approval

- Thermal improvement: . . . . . .

Required

Not required

- Exposure category to BS 6375-1/ Design wind load: . . . . . .

1200 Pa

1600 Pa

2000 Pa

??? Pa

- Operation and strength characteristics: To BS 6375-2.
- Glazing details: . . . . . .

Insulating glass units incorporating low emissivity glass (en = 0.2), air filled

Insulating glass units incorporating low emissivity glass (en = 0.15), air filled

Insulating glass units incorporating low emissivity glass (en = 0.1), air filled

Insulating glass units incorporating low emissivity glass (en = 0.05), air filled

Exposure category (clause 410): See general guidance 1. Insert the actual design wind pressure if over 2000 Pa.
Glazing details: Composite windows are normally factory glazed. Use this item to state, e.g.
- Type and thickness of glass.
- Requirement for double/ triple glazing.
- Internal or external bead glazing.

The availability of any options should be checked with the manufacturer before specifying.
Site glazing, if required, should be specified in section L40.
Ironmongery/ Accessories (clause 400): Many window ranges are supplied complete with all necessary hardware. Use this item to describe components supplied as standard and any variations or extras. Only include items to be supplied by the window manufacturer. Components to be supplied and fixed by others should be specified in section P21.
Ironmongery/ Accessories (clause 410): Lists hardware required including locking, security and safety devices. State material and finish where relevant. Alternatively, where proprietary products are to be specified, insert *As section P21*, and include suitable clauses in that section to cover requirements.
Fixing: See clause 784. Insert e.g.
Screw fixing.
Lug fixing.

Other reference(s) cited:
BS 6375-1
BS 6375-2.

Insulating glass units incorporating low emissivity glass (en = 0.2), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.1), argon filled
Insulating glass units incorporating low emissivity glass (en = 0.05), argon filled
– Beading: . . . . . .
External
Internal
- Ironmongery/ Accessories: . . . . . .

Casement stay
Extension sill
Espagnolette lock
Espagnolette lock, mushroom head
Handle
Locking handle
Restrictor
Trickle ventilator
Aluminium
Brass
Bronze
Chromium plated
Nylon
Stainless steel
Adhesive glazing tape
Security glazing clips
Security glazing packers
- Fixing: . . . . . .

Lug fixing
Screw fixing

420
Use this clause for wood subframes to steel, aluminium, or plastics windows.
Timber:
– Species: Insert the name of the required species, selecting from BS EN 942, National Annex NA, table NA1 or NA2 as appropriate. Alternatively leave the choice to the manufacturer and insert, e.g.
Softwood as table NA1.
Hardwood as table NA2.
To approval.
– Appearance class: Select the class from BS EN 942. Class J40 (maximum knot size 40 mm) will generally be satisfactory for opaque finished frames and Class J30 (maximum knot size 30 mm) for clear finishing.
Assembly adhesive: See general guidance 2. Insert, e.g.
Thermosetting resin to BS EN 12765, class C4.
PVAC to BS EN 204, class D4.
Preservative treatment: See guidance in section Z12. Insert, e.g.
Organic Solvent as section Z12 and WPA Commodity Specification C5; Desired service life 30 years.
Include the relevant clauses from Z12 in the specification, where appropriate.
Finish as delivered: Insert, e.g. *Prepared and primed as section M60*.
Fixing: See clause 780. Insert, e.g. *Built in with cramps.*

Other reference(s) cited:
BS EN 204
BS EN 12765
WPA Industrial Wood Preservation. Specification and practice
NBS section M60
NBS section Z10.

420 Wood subframes
- Timber: To BS EN 942.

– Species: . . . . . .

Softwood as table NA.1
Hardwood as table NA.2
American white oak
Douglas fir
European birch
European redwood
European whitewood
Western hemlock

– Appearance class: . . . . . .

J30
J40

– Moisture content on delivery: 12–19%.
- Assembly adhesive: . . . . . .

PVAC to BS EN 204, class D4
Thermosetting resin to BS EN 12765, class C4
- Joinery workmanship: As section Z10.
- Preservative treatment: . . . . . .

Organic Solvent as section Z12 and WPA Commodity Specification C5; Desired service life 30 years
- Finish as delivered: . . . . . .

Full paint system as section M60
Prepared and primed as section M60
Primer and undercoat as section M60
- Fixing: . . . . . .

Built in with cramps
Bolted to masonry reveal

440
PVC-U subframes are for use with metal and PVC-U windows.

440 PVC-U subframes
- Manufacturer: . . . . . .

Contractor's choice

Submit proposals
– Product reference: . . . . . .
Contractor's choice
Submit proposals
• Fixing: Use lugs and ties supplied by subframe manufacturer.

460
Use this clause for glazed components to be installed in essentially flat or low pitched roofs for the primary purpose of providing natural lighting. Specify roof windows (glazed components installed in the plane of a pitched roof) using clause 480. Specify components providing natural ventilation and/ or smoke control in clause 490.
Type: Give a brief description of shape and function. Rooflights are basically square, rectangular or circular on plan, and dome, pyramid or flat in section. They can take the form of continuous barrel vaults, deadlights, lantern lights and monitors. Include size and location if variants are simple – otherwise give dimensions on drawings.
Frame: Rooflights may be framed in aluminium, reinforced PVC-U, etc. Insert *None* if unframed units are specified.
Kerb: If to be formed by the main contractor, insert, e.g. *Timber by main contractor*.
Proprietary kerbs may incorporate ventilators and/ or be insulated.
Glazing details: State material and whether single or double glazed. Rooflights are made from acrylic, polycarbonate, PVC-U (including wired), GRP and wired glass.
The size and disposition of rooflights made from thermoplastic materials are controlled under the Building Regulations. For guidance, see:
• **E&W** Approved Document B Vol 1, paras 3.10, 10.6 and 10.7.
• **E&W** Approved Document B Vol 2, paras 6.12, 14.6 and 14.7.
• **IRL** Technical Document B, paras 2.3.3 and 4.3.5.
• **NI** Technical Booklet E, paras 2.14 and 4.21.
• **Scot** Technical Handbook clause 2.5.6, Domestic or Non-domestic.
Other requirements: Use this item to specify features such as security bars and gutter systems for large rooflight assemblies.
Fixing: Give brief details of method of securing rooflight to kerb or other supporting structure, e.g. *Screw, sealer cap and washer.*

460 Rooflights
• Manufacturer: . . . . . .
Contractor's choice
Submit proposals
– Product reference: . . . . . .
Contractor's choice
Submit proposals
• Type: . . . . . .
Barrel vault
Dome
Flat
Modular
Pyramid
Rectangular
Round
Square
• Frame: . . . . . .
None
Aluminium
Integral with rooflight
Moulded rigid polyurethane
– Finish: . . . . . .
– Colour: . . . . . .
• Kerb: . . . . . .
Aluminium
Galvanized steel
Glass fibre
PVC-U
Timber by main contractor
• Glazing details: . . . . . .
GRP
Polycarbonate
PVC-U
Single skin
Double skin
Triple skin
Bronze tint
Clear
Opal
Diffused
• Other requirements: . . . . . .
Anti-burglar bars
Glazed ventilator
Louvre ventilator
Solar blind
Solar panel
Solar shading louvre
Adhesive glazing tape
Security glazing clips
Security glazing packers
• Fixing: . . . . . .

480
Use this clause for glazed components to be installed in the plane of a pitched roof. Specify rooflights (glazed components installed in flat or low pitched roofs) using clause 460. Specify components providing natural ventilation and/ or smoke control in clause 490.
The roof pitch will determine the type of window that can be used.
Where a roof window is provided for escape from a room above ground storey level, it should be positioned in accordance with the guidelines given in Building Regulations:
• **E&W** Approved Document B Vol 1, para 2.8.

480 Roof windows
• Manufacturer: . . . . . .
Contractor's choice
Submit proposals
– Product reference: . . . . . .
Contractor's choice
Submit proposals
• Glazing details: . . . . . .
Insulating glass units incorporating low emissivity glass
– Beading: . . . . . .

- **E&W** Approved Document B Vol 2, para 2.9.
- **IRL** Technical Document B, paras 1.5.6 and 1.5.7.6.
- **NI** Technical Booklet E, section 1, paras 1.4, 1.22 and diagram 1.1.
- **Scot** Technical Handbook clauses 2.9.4, Non-domestic and 2.9.30, Non-domestic.

Glazing details: Use this item to state whether factory glazing is required and, if so, the type and thickness of glass, bead fixing method, etc. Specify site glazing in section L40.

To comply with Building Regulations, a roof window installed within 6 m of a boundary must achieve an AA, AB or AC designation when tested in accordance with BS 476-3:2004 – see:

- **E&W** Approved Document B Vol 1, paras 10.4, 10.5 and table 5.
- **E&W** Approved Document B Vol 2, paras 14.4, 14.5 and table 16.
- **NI** Technical Booklet E, paras 4.19, 4.20 and table 4.7.
- **IRL** Technical Document B, paras 4.3.3, 4.3.4 and table 4.4.
- **Scot** Technical Handbook clause 2.8.1, Domestic and Non-domestic, and Annex 2D, Domestic and Non-domestic.

Note that BS 476-3 was updated in 2004 and is referred to in Building Regulations, Approved Document B; however, manufacturers may still be working and testing to the 1958 edition.

The use of toughened, laminated or wired (Georgian) glass will give safety and security benefits, although wired glass may not be aesthetically acceptable for some applications.

Flashings: Insert details of roof tiling. Flashings to suit most commonly available tile profiles are usually available.

Accessories: Insert, e.g. *Cord remote control, pleated blind, internal lining and safety latch.*

Fixing: Give brief details of method of securing roof window to kerb or other supporting structure, e.g. *Galvanized steel brackets screwed to rafters and trimmers.*

External
Internal
- Flashings: By window manufacturer to suit . . . . . .

Bold roll tile
Clay plain tile
Cross cambered clay plain tile
Double pantile
English pantile
Single Roman tile
Double Roman tile
Plain concrete slate
Standard pattern interlocking concrete tile
- Accessories: . . . . . .

None
Cord remote control
Internal lining
Pleated blind
Safety latch
Adhesive glazing tape
Security glazing clips
Security glazing packers
- Fixing: . . . . . .

490

Use this clause for ventilators providing natural ventilation and/ or smoke control. Specify powered ventilation units and passive stack ventilation terminals in the appropriate engineering services section.

Type: Insert *Glazed*, *Louvred*, *Flap* or *Sliding*.

Controls: Various control options are available, including linear actuator, pneumatic cylinder, electromagnetic latch and manual.

Materials: Insert, e.g.

Frame: Aluminium, Louvres: 9 mm clear, UV protected, twinwall polycarbonate.

Frame: Aluminium; Glazing: 28 mm insulating glazing unit.

– Finish as delivered: Insert, e.g. *Principal components polyester powder coated.*

Seals: Louvre type ventilators can be fitted with weatherseals to reduce heat loss when closed. Insert *Required*, *Not required*, or *Not applicable*. Give details where a choice of seals is offered.

Guards: These can be factory fitted. Insert *Insect*, *Bird*, *Security*, *Burglar,* etc. or *Not required*.

Accessories/ Special features: Insert, e.g.

Aluminium covers to actuators.

Controllable side dampers.

Fixing: Give brief details of method of securing roof ventilator to kerb or other supporting structure, e.g.

Screw fixed to kerb.

Galvanized steel lugs.

490 Roof ventilators
- Manufacturer: . . . . . .

Contractor's choice
Submit proposals
  – Product reference: . . . . . .

Contractor's choice
Submit proposals
- Type: . . . . . .

Flap
Glazed
Louvred
Sliding
- Controls: . . . . . .

Electromagnetic latch
Linear actuator
Manual
Pneumatic cylinder
- Materials: . . . . . .

Frame: Aluminium
Glazing: 28 mm insulating glass unit
Louvres: 9 mm clear, UV protected, twinwall polycarbonate
  – Finish as delivered: . . . . . .

Principal components polyester powder coated
- Seals: . . . . . .

Not applicable
Not required
Required
- Guards: . . . . . .

Not required
Bird
Burglar
Insect
Security
- Accessories/ Special features: . . . . . .

None
Aluminium covers to actuators
Controllable side dampers

• Fixing: . . . . . .

495
Daylight collected through a roof mounted terminal – usually a transparent dome – is transmitted through the roof space via a tube with a highly reflective inner surface, and is 'released' into the room below through a diffuser. Recommended maximum pipe lengths are ~8 m for small pipes and ~20 m for large. Bends (30°, 45° and adjustable) are used to get around obstacles. Natural ventilation and artificial light can be incorporated.
Diameters: Range from 230 mm (for lighting small areas up to ~6 m², e.g. lobbies, shower rooms) to 1500 mm (for lighting up to 90 m²).
Accessories: Give details of roof flashings for flat or pitched roofs, fire collars, security bars, low voltage lighting, etc.
Fixing: Give method of securing components to supporting structure.

495 Daylight pipe . . . . . .
• Manufacturer: . . . . . .
Contractor's choice
Submit proposals
– Product reference: . . . . . .
Contractor's choice
Submit proposals
• Components: . . . . . .
– Pipe: . . . . . .
Aluminium, silvered internally
Flexible metallized polyester
Diameter: . . . . . .
230 mm
250 mm
300 mm
450 mm
530 mm
550 mm
750 mm
1000 mm
1500 mm
Length: . . . . . .
– Bends: . . . . . .
None
30°
45°
Adjustable
– Roof terminal: . . . . . .
Polycarbonate dome (opal)
Polycarbonate dome (UV protected)
– Ceiling terminal: . . . . . .
Double glazed diffuser
Ventilating diffuser
• Accessories: . . . . . .
Fire collar
Low voltage lighting kit
Roof flashing to suit inverted warm roof
Roof flashing to suit natural slating
Roof flashing to suit plain tiling
Security bars
• Fixing: . . . . . .
In accordance with manufacturer's instructions

510
Use this clause for purpose designed wood screens. Use clause 560 to specify proprietary screen systems.
Where the screen incorporates a door or doorset, include in the item for special features a cross reference to section L20 and specify requirements in that section.
Location: Insert, e.g. *Between general office and sales area.*
Timber:
– Species: Insert the name of the required species, selecting from BS EN 942, National Annex NA, table NA1 or NA2 as appropriate. Alternatively, leave the choice to the manufacturer and insert, e.g.
Softwood as table NA1.
Hardwood as table NA2.
To approval.
– Appearance class: Insert class (or classes) selected from BS EN 942. Small sections, e.g. glazing beads and door stops should be Class J2, Class J5 or Class J10. Specification of these classes for larger sections may involve significant extra cost.
– Moisture content on delivery: BS EN 942 specifies:
• 13–19% for external joinery.
• 12–16% for unheated buildings.
• 9–13% for buildings with heating providing room temperatures in the range 12–21°C.

510 Glazed wood screens
• Location: . . . . . .
• Timber: Generally to BS EN 942.
– Species: . . . . . .
Softwood as table NA.1
Hardwood as table NA.2
American white oak
Douglas fir
European birch
European redwood
European whitewood
Western hemlock
To approval
– Appearance class: . . . . . .
J2
J5
J10
J20
J30
J40
J50
– Moisture content on delivery: . . . . . .
13–19%

- 6–10% for buildings with heating providing room temperatures in excess of 21°C (joinery at this moisture content will only be available by special order or agreement, and appropriate protection and storage should be arranged to maintain its condition).

Panels: Insert details of opaque panels, e.g. *12 mm plywood, oak veneered both sides.*
Assembly adhesive: See general guidance 2. Insert, e.g.
Thermosetting resin to BS EN 12765, class C4.
PVAC to BS EN 204, Class D4.
Finish as delivered: Where the screens are to be supplied primed for painting or sealed to receive a staining system, specify as part of the overall painting system in section M60 and give the relevant cross reference here, e.g. *Prepare and seal as section M60*.

If the screens are to be installed into prepared openings and not built in as the work proceeds, consider having the full finishing system applied in the workshop. Extra care and protection is required during the installation of finished components.
Glazing details: Insert, e.g. *Hardwood beads fixed with brass cups and screws.* Specify glazing system in section L40.
Special features/ Other requirements: Insert, e.g.
Carved and pierced panels.
Glazed panelled door as section L20.
Fixing: See clause 780. Insert, e.g.
Screw fixing and pelleting.
Bolted to masonry reveal.

Other reference(s) cited:
BS EN 204
BS EN 301
BS EN 12765
NBS section Z10.

12–16%
9–13%
6–10%
- Panels: . . . . . .

12 mm plywood, oak veneered both sides
- Assembly adhesive: . . . . . .

PVAC to BS EN 204, Class D4
Synthetic resin to BS EN 301, type I
- Joinery workmanship: As section Z10.
- Finish as delivered: . . . . . .

Full paint system as section M60
Prepared and primed as section M60
Primer and undercoat as section M60
Full stain system as section M60
Basecoat stain as section M60
Basecoat stain and first topcoat as section M60
- Glazing details: . . . . . .

Hardwood beads fixed with brass cups and screws
Propriety intumescent glazing system
As drawing ???
- Special features/ Other requirements: . . . . . .

None
Carved and pierced panels
Glazed panelled door as section L20
Scrolled uprights
- Fixing: . . . . . .

Bolted to masonry reveal
Screw fixed and pelleted

550
Use this clause for purpose designed screens of steel, aluminium, bronze or copper alloy standard or proprietary sections. Repeat the clause as necessary for different types of screen. Use clause 560 to specify proprietary screen systems.

Where the screen incorporates a door or doorset, include in the item for special features a cross reference to section L20 and specify requirements in that section.
Location: Insert, e.g. *Between cafeteria and shop floor*.
Materials and workmanship:
– Frame members: Give a brief description of sections or a proprietary reference, e.g.
Rolled steel angles and hollow sections.
Alsec Masterframe – as shown on drawings.

Finish: Steel frame members may be:
- Painted, e.g. with red oxide primer.
- Galvanized to BS EN ISO 1461.
- Powder coated to BS EN 13438.

Aluminium frame members may be:
- Anodized to BS 3987.
- Liquid organic coated to BS 4842.
- Powder organic coated to BS 6496.

For further information about finishes, see section Z11, general guidance. Specify site painting in section M60.
– Panels: Insert details of opaque panels, etc., e.g. *Aluboard*.
Jointing: Insert relevant details, e.g.
Welded.
Brazed.
Machine screws to backing plates.
Glazing details: Insert, e.g. *Clip on anodized aluminium beads.* Specify glazing system in section L40.
Special features/ Other requirements: Insert, e.g.
Curved units and glazing at corners.
Frameless glass doors as section L20.
Fixing: See clause 782. Insert, e.g. *Screwed to masonry*.

550 Glazed metal screens
- Location: . . . . . .
- Materials and workmanship: As section Z11.
  - Frame members: . . . . . .

Aluminium
Steel
Angles
Hollow sections
Finish: . . . . . .
Anodized
Galvanized
Primed and painted
Polyester powder coated
Organic coated
- Panels: . . . . . .
  Finish: . . . . . .
- Jointing: . . . . . .

Brazed
Machine screws to backing plates
Welded
- Glazing details: . . . . . .

Aluminium
Steel
clip on beads
screw on beads
Propriety intumescent glazing system
As drawing ???
- Special features/ Other requirements: . . . . . .

None
Curved units and glazing at corners
Frameless glass doors as section L20
- Fixing: . . . . . .

Screwed to masonry

560
Use this clause for proprietary screen systems. Use clause 510 for purpose designed wood screens. Use clause 550 for purpose designed metal screens.

The amount of detail required will depend on the range of options offered by the manufacturer. Insert *Not applicable* where appropriate.

Location: Insert, e.g.
Between sales area and general office.
Corridor walls adjacent atrium.

Screen height: The overall height may influence construction, particularly if the screen extends above a suspended ceiling to the soffit of a floor slab above. Insert, e.g. *Floor to ceiling (2700 mm).*

Fire resistance rating: Give requirements for fire resistance in terms of integrity and/ or insulation when tested to BS 476-22. Insert, e.g.
To BS 476-22: 30/30 minutes integrity/ insulation.
To BS 476-22: 30 minutes integrity only.

Sound insulation rating: The airborne sound insulating effect of a screen is generally expressed as a weighted sound reduction index (Rw), which is a measure of the difference in sound levels either side of the screen. The higher the Rw figure, the better. Typically, using a screen with an Rw value of 40 dB will mean that loud conversation on one side of the screen will be heard but not distinguishable. A range of sound insulation levels many be offered. Insert, e.g. *Rw 40 dB*.

Materials: Insert requirements from manufacturer's available options.

Glazing details: The range of glass types offered within a particular range may be limited, and choice will be further constrained by any fire rating required.

Include here details of any manifestation markings required for large areas of glazing.

Incorporated features: Where the screen incorporates a doorset, give details as follows:
- Doorset provided as part of the system: Give precise requirements for door frame and door, including vision panels and ironmongery.
- Doorset provided by others or purpose made: Cross refer to section L20 and specify requirements there, e.g. *Doorset as section L20.*

Note that incorporating components from a difference source is likely to invalidate the fire certificate for the screen, and further testing or assessment of the combined assembly may be required.

Accessories/ Other requirements: Include here details of any ancillary items to be supplied by the screen manufacturer, e.g. blinds, skirtings, architraves and other trims.

Fixing: Insert, e.g. *Bolted to masonry reveal.*

560 Glazed screen system
- Location: . . . . . .
- Manufacturer: . . . . . .

Contractor's choice
Submit proposals
– Product reference: . . . . . .

Contractor's choice
Submit proposals
- Screen height: . . . . . .

Floor to ceiling (2700 mm)
- Fire resistance rating of complete system: . . . . . .

To BS 476-22, 30/30 minutes integrity/ insulation
To BS 476-22, 30 minutes integrity only
- Sound insulation rating: . . . . . .

Rw 40 dB
- Materials:
  – Frames: . . . . . .
    Finish: . . . . . .
  – Panels: . . . . . .
    Finish: . . . . . .
- Glazing details: . . . . . .

Aluminium
Steel
clip on beads
screw on beads
Propriety intumescent glazing system
As drawing ???
- Incorporated features: . . . . . .

Frameless glass doors as section L20
- Accessories/ Other requirements: . . . . . .
- Fixing: . . . . . .

Bolted to masonry reveal
Screw fixed and pelleted

580
Secondary glazing installation is normally a retrofit operation. A properly installed system can improve noise and thermal insulation, draught proofing and security.

Clause heading: Insert, e.g. *TO STREET ELEVATION WINDOWS*

Type: Typical configurations are horizontal sliding, vertical sliding, hinged casement, lift out and fixed.

Framing material: Insert, e.g.
Aluminium.
PVC-U.

– Finish as delivered: Insert, e.g.
Bronze anodized.
Polyester powder coated, colour: RAL 123.

Glazing details: Check availability of options with manufacturer. Insert *As supplied* if the glazing method is not a variable feature of the system. Specify site glazing in section L40.

Ironmongery/ Accessories: Some systems are supplied complete with all necessary hardware. Use this item to describe components supplied as standard and any variations and/ or extras, e.g. acoustic linings, blinds, coupling mullions/ transoms, trickle ventilators.

Grounds/ Subframe: Insert manufacturer's recommendation or *Not required*.

Fixing: Insert, e.g. *Screwed to wood subframe.*

580 Secondary glazing system . . . . . .
- Manufacturer: . . . . . .

Contractor's choice
Submit proposals
– Product reference: . . . . . .

Contractor's choice
Submit proposals
- Type: . . . . . .

Fixed
Hinged casement
Lift out
Horizontal sliding
Vertical sliding
- Framing material: . . . . . .

Aluminium
PVC-U
– Finished as delivered: . . . . . .

Bronze anodized
Polyester powder coated, colour: RAL 123
- Glazing details: . . . . . .

As supplied
As drawing ???
- Ironmongery/ Accessories: . . . . . .

Acoustic linings
Blinds
Coupling mullions/ transoms
Trickle ventilators
- Grounds/ Subframe: . . . . . .

Not required
- Fixing: . . . . . .

Screwed to wood subframe

605

Use this clause for proprietary wood louvres incorporated as interior or exterior architectural features of the building. Specify internal and external air terminal devices for ventilation and air conditioning systems in the appropriate engineering services section. Use clause 610 for purpose designed architectural louvres.

Species: Select from the range offered by the manufacturer, or insert *Softwood* or *Hardwood.*

Fire resistance rating: Insert *Not applicable* where fire rated products are not required.

Number of louvre banks: Additional banks of louvres give increased exposure and weather resistance.

Louvre blade pitch and angle: Obtain details from manufacturer's literature.

Blanking panels: Obtain details from manufacturer's literature. Areas where they are to be fitted should be shown on drawings.

Finish as delivered: See guidance to clause 610. Insert, e.g. *Undercoated*.

Accessories/ Other requirements: Give details of items such as bird/ insect guards, access doors, special shapes.

Fixing: See clause 780. Insert, e.g. *Screwed and pelleted.*

605 Wood louvres
- Manufacturer: . . . . . .

Contractor's choice
Submit proposals
  – Product reference: . . . . . .

Contractor's choice
Submit proposals
- Species: . . . . . .

Hardwood
Softwood
- Fire resistance rating: . . . . . .

Not applicable
30 minutes
60 minutes
- Number of louvre banks: . . . . . .

One
Two
Three
- Louvre blade pitch and angle: . . . . . .

Angle: 45°
Pitch: 75 mm
Pitch: 100 mm
- Blanking panels: . . . . . .

Not required
- Finish as delivered: . . . . . .
- Accessories/ Other requirements: . . . . . .

Access door
Removable section for plant access
Stainless steel bird mesh
- Fixing: . . . . . .

Screwed and pelleted

610

Use this clause for purpose designed wood louvres incorporated as interior or exterior architectural features of the building. Specify internal and external air terminal devices for ventilation and air conditioning systems in the appropriate engineering services section. Use clause 605 for proprietary architectural products.

The disposition of the louvres (the blade pitch and angle, etc.) should be shown on detail drawings.

Timber:

– Species: Insert the name of the required species selecting from BS EN 942, National Annex NA, table NA1 or NA2 as appropriate. Alternatively leave the choice to the manufacturer and insert, e.g. *Softwood as table NA1.* *Hardwood as table NA2.* *To approval.*

– Appearance class: Select from BS EN 942. Class J40 (maximum knot size 40 mm) will generally be satisfactory for opaque finished louvres and Class J30 (maximum knot size 30 mm) for clear finishing.

– Moisture content on delivery: BS EN 942 specifies:
- 13–19% for external joinery.
- 12–16% for unheated buildings.
- 9–13% for buildings with heating providing room temperatures in the range 12–21°C.
- 6–10% for buildings with heating providing room temperatures in excess of 21°C.

Blanking panels: Insert details of materials used to blank off louvres, e.g. *12 mm plywood, bonding quality to BS EN 314-2, Class 3*. For guidance on specifying board materials see section K11.

610 Wood louvres
- Timber: Generally to BS EN 942.
  – Species: . . . . . .

Softwood as table NA.1
Hardwood as table NA.2
American white oak
Douglas fir
European birch
European redwood
European whitewood
Western hemlock
To approval
  – Appearance class: . . . . . .

J20
J30
J40
  – Moisture content on delivery: . . . . . .

13–19%
12–16%
9–13%
6–10%
- Blanking panels: . . . . . .

Not required
12 mm plywood, bonding quality to BS EN 314-2, Class 3
- Assembly adhesive: . . . . . .

PVAC to BS EN 204, class D4
Synthetic resin to BS EN 301, type I
- Preservative treatment: . . . . . .

Assembly adhesive: See general guidance 2. Insert, e.g.
Thermosetting resin to BS EN 12765, class C4.
PVAC to BS EN 204, class D4.
Preservative treatment: See guidance in section Z12. Insert, e.g.
Organic solvent as section Z12 and WPA Commodity Specification C5; Desired service life 30 years.
Finish as delivered: Where the louvres are to be supplied primed for painting or sealed to receive a staining system, specify as part of the overall painting system in section M60 and give the relevant cross reference here e.g. *Prepared and sealed as section M60.*
If the louvres are to be installed into prepared openings and not built in as the work proceeds, consider having the full finishing system applied off site. Extra care and protection is required during the installation of finished components.
Fixing: See clause 780. Insert, e.g. *Screwed and pelleted.*

Other reference(s) cited:
BS EN 204
BS EN 301
BS EN 314-2
WPA Industrial Wood Preservation. Specification and practice
NBS section Z10.

Organic solvent as section Z12 and WPA Commodity Specification C5; Desired service life 30 years
- Finish as delivered: . . . . . .

Full paint system as section M60
Prepared and primed as section M60
Primer and undercoat as section M60
Full stain system as section M60
Basecoat stain as section M60
Basecoat stain and first topcoat as section M60
- Joinery workmanship: As section Z10.
- Fixing: . . . . . .

Screwed and pelleted

650
Use this clause for proprietary metal louvres incorporated as interior or exterior architectural features of the building. Specify internal and external air terminal devices for ventilation and air conditioning systems in the appropriate engineering services section.
Material: Insert, e.g. *Stainless steel*.
– Finish as delivered: Manufacturers may offer options, e.g.
Primed for painting.
Organic powder coating to BS 6496 (on aluminium extrusions).
Specify site painting in section M60.
Fire resistance rating: Insert *Not applicable* where fire rated products are not required.
Number of louvre banks: Can be single, double or triple depending on exposure and weather resistance required.
Louvre blade pitch and angle: Obtain details from manufacturer's literature.
Blanking panels: These may be single skin or insulated. Areas where they are to be fitted should be shown on drawings.
Accessories/ Other requirements: Insert, e.g.
Access door.
Stainless steel bird mesh.
Fixing: See clause 781. Insert, e.g. *Bolted to structural steelwork.*

Other reference(s) cited:
BS 6496.

650 Metal louvres
- Manufacturer: . . . . . .

Contractor's choice
Submit proposals
  – Product reference: . . . . . .

Contractor's choice
Submit proposals
- Material: . . . . . .

Aluminium
Stainless steel
Steel
  – Finish as delivered: . . . . . .

Anodized
Galvanized
Manufacturer's primer
Painted
Powder coated
Dull polished
Satin polished
Bright buffed
- Fire resistance rating: . . . . . .

Not applicable
30 minutes
60 minutes
- Number of louvre banks: . . . . . .

One
Two
Three
- Louvre blade pitch and angle: . . . . . .

Pitch: 75 mm
Pitch: 100 mm
- Blanking panels: . . . . . .

Not required
- Accessories/ Other requirements: . . . . . .

Access door
Removable section for plant access
Stainless steel bird mesh
- Fixing: . . . . . .

670
A 'brise soleil', or sunscreen, is a perforated screen or system of louvres strategically fixed to the external envelope of a building to provide shading to windows, thus reducing solar heat gain and glare. BRE Information Paper IP 17/03 gives data that can be used to

670 Brise soleil
- Manufacturer: . . . . . .

Contractor's choice
Submit proposals
  – Product reference: . . . . . .

quantify the effect of these devices for the purposes of satisfying Building Regulation requirements.

Loadbearing systems can be designed to provide access walkways for maintenance purposes. A fall arrest system is usually needed with these systems – include a cross reference here in the item for 'Special features/ Other requirements' and specify in section N25.

See general guidance 5.3 for information relating to BREEAM models.

Materials/ Finish:

– Louvre blades/ Side support arms: These are generally fabricated in aluminium. A range of finishes is available, including mill finished, powder coated, anodized and PVF2 (polyvinylidene fluoride) coated.

– Mounting brackets: These are usually steel or aluminium. Where the brise soleil is fixed to a steel frame, the mounting brackets are best provided and attached by the steelwork contractor. Insert, e.g. *Galvanized steel by others*.

– Support struts: These spread the moment forces associated with the cantilevered screen over a larger area. They can be used in tension above the screen or in compression below it. They may not be needed where the screen projection is short and a sufficiently strong mounting can be achieved. Note that some materials in certain section sizes must not be used in compression – seek manufacturers' advice. Insert, e.g.

10 mm polished stainless steel tension rods.
25 mm aluminium compression struts.
Not required.

– Fasteners: Care must be taken to avoid bimetallic corrosion. Insert, e.g. *M8 stainless steel bolts.*

Accessories/ Special features: Insert, e.g.

Mitred and welded corner panels.
Fall arrest system as section N25.

Contractor's choice
Submit proposals
- Materials/ Finish as delivered:
  – Louvre blades: . . . . . .

Aluminium
Steel
Mill finished
Anodized
Powder coated
Polyester powder coated
PVF2 coated

  – Side support arms: . . . . . .

Aluminium
Steel
Mill finished
Anodized
Powder coated
Polyester powder coated
PVF2 coated

  – Mounting brackets: . . . . . .

Aluminium
Galvanized steel by others

  – Support struts: . . . . . .

Not required
10 mm polished stainless steel tension rods
25 mm aluminium compression struts

  – Fasteners: . . . . . .

M8 stainless steel bolts

- Accessories/ Special features: . . . . . .

None
Mitred and welded corner panels
Fall arrest system as section N25

680

See general guidance 5.3 for information relating to BREEAM models.

Clause heading: Insert, e.g. *TO WINDOWS ON SOUTH AND WEST ELEVATIONS*

Type: Insert, e.g.

Exterior roller blind.
Folding arm awning.
External venetian blind.

Mode of operation: Insert, e.g.

Manual.
Motorized – radio controlled electric.

– Power supply: Give details, e.g. *Domestic mains voltage supply*, or insert *Not required.*

Operating mechanism: Insert details of cassette housing, guide rails, support arms, etc. as appropriate, including material and finish where a choice is available.

Shading device:

– Material: Insert, e.g.

Polyester fabric.
60 mm rolled edge aluminium slats.

Fixing: Give brief details, noting particular requirements, e.g. for accuracy of line and level for coupled units.

680 Solar shading system . . . . . .
- Manufacturer: . . . . . .

Contractor's choice
Submit proposals

  – Product reference: . . . . . .

Contractor's choice
Submit proposals
- Type: . . . . . .

Folding arm awning
Exterior roller blind
External venetian blind
- Mode of operation: . . . . . .

Manual
Manual crank
Motorized – electric
Motorized – radio controlled electric

  – Power supply: . . . . . .

Domestic mains voltage supply
Not required
- Operating mechanism: . . . . . .
- Shading device:
  – Material: . . . . . .

Polyester fabric
60 mm rolled edge aluminium slats

  – Colour: . . . . . .

- Fixing: . . . . . .

690

Use this clause for additional security systems such as grilles, secondary screens, etc. Expand the clause to include additional features, if required.

Clause heading: Insert, e.g. *GRILLES TO GROUND FLOOR WINDOWS*

Type: Insert, e.g.

690 Security . . . . . .
- Manufacturer: . . . . . .

Contractor's choice
Submit proposals

  – Product reference: . . . . . .

Contractor's choice
Submit proposals

Framed mesh screen.
Metal bar.
Fixing: Give brief details, noting particular requirements, e.g. for accuracy of line and level for coupled units.

- Type: . . . . . .
- Finish as delivered: . . . . . .
  - Colour: . . . . . .
- Accessories/ Special features: . . . . . .
- Fixing: . . . . . .

Execution

710
Factory finished windows are usually delivered to site with protective wrappings, tapes, etc. and these should be left on to protect the components during storage. Paper or cardboard wrappings, however, should be removed if there is a risk of them becoming damp or getting wet.

Anodized aluminium is susceptible to attack by alkaline building materials, e.g. cement, plaster and some cleaning materials. Strippable tapes, wax coatings or lacquers are used for protection. Where the windows are to be built in, protective tapes should be left in place until the adjacent building work is complete and then removed immediately, as sunlight, weathering and time may make them difficult to remove. Lacquer coatings should be left to weather away.

710 Protection of components
- General: Do not deliver to site components that cannot be installed immediately or placed in clean, dry floored and covered storage.
- Stored components: Stack vertical or near vertical on level bearers, separated with spacers to prevent damage by and to projecting ironmongery, beads, etc.

730
Specify priming and sealing in section M60. Paints in direct contact with aluminium should not contain copper or mercury fungicides, graphite or lead.

730 Priming/ Sealing
- Wood surfaces inaccessible after installation: Prime or seal as specified before fixing components.

740
Copper alloys should not be in direct contact with iron, steel, zinc (including galvanizing) or aluminium.
Aluminium alloys should not be in direct contact with:
- Timber treated with copper, zinc or mercury based preservatives.
- Oak, sweet chestnut, Douglas fir and western red cedar, unless well seasoned.
- Iron and steel unless galvanized.
- Copper or copper alloys and rainwater which has run over them.
- Concrete, mortar or plasters, especially when embedded.
- Soil.
- Paints containing copper or mercury based fungicides, graphite or lead.
- Lead and stainless steel in heavily polluted atmospheres.

Anodizing will not protect the alloy when in contact with the above materials. Aluminium is not affected by contact with zinc or cadmium but contact will accelerate their rate of corrosion. For additional information about the protection of aluminium against corrosion, see BS 8118-2, Section 4 or BS EN 1999-1-1, Annex D.

Insert, e.g. *Aluminium alloy components in contact with preservative treated timber.*

Other reference(s) cited:
BS 6949.

740 Corrosion protection
- Surfaces to be protected: . . . . . .
- Protective coating: Two coats of bitumen solution to BS 6949 or an approved mastic impregnated tape.
  - Timing of application: Before fixing components.

750
If the contractor is permitted to build in components, ensure that the corresponding clause in section F30 (building in frames) is included in the specification, if appropriate.

Often a steel or aluminium window is fitted into a wood subframe to give a bolder sight line. The subframe may be used as a template, allowing the window to be installed at a later date.

750 Building in
- General: Not permitted unless indicated on drawings.
  - Brace and protect components to prevent distortion and damage during construction of adjacent structure.

755
Use this clause for new and replacement PVC-U window installation work.

Other reference(s) cited:
British Plastics Federation Code of practice for the survey and installation of windows and external doorsets.

755 PVC-U window installation
- Standard: In accordance with clause 783 and British Plastics Federation 'Code of practice for the survey and installation of windows and external doorsets'.

760
Use this clause for the installation, into existing structural openings in dwellings, of windows manufactured from metal, plastics or wood, supplied with or without surrounds. BS 8213-4 does not apply to secondary sashes, nor does it cover design, materials, finishes, quality or workmanship of the windows.

760 Replacement window installation
- Standard: To BS 8213-4.

765
The recommended maximum perimeter gap for steel windows is 3 mm. A 10 mm gap is generally recommended for plastics windows. In all cases, joints exceeding 10 mm should be avoided.

765 Window installation generally
- Installation: Into prepared openings.
- Gap between frame edge and surrounding construction:
  - Minimum: . . . . . .
  - Maximum: . . . . . .
- Distortion: Install windows without twist or diagonal racking.

766
Use this clause where the location of openable windows is the responsibility of the contractor and the completed scheme is to be assessed under one of the BREEAM models.

The BREEAM models award a credit where measures are taken to reduce the risk to health associated with poor indoor air quality.

Part of the credit criteria requires that openable windows in naturally ventilated buildings are positioned more than 10 m away from any source of external pollution, e.g.
- Highways and the main access roads on the assessed site.
- Car parks and delivery/ vehicle waiting bays.
- Building exhausts, including from building services plant.
- Industrial/ agricultural processes.

766 Location of openable windows in naturally ventilated buildings
- Location: Over 10 m from sources of external pollution.

770
Where components are not to be built in it is highly desirable that templates are used – see clause F30/840.

770 Damp proof courses in prepared openings
- Location: Ensure correct positioning in relation to window frames. Do not displace during fixing operations.

780–784
For guidance on site handling and installation of windows, see:
- BS 644, clause 5.7.
- BS 8213-4.
- SWA 'Specifier's guide to steel windows'.
- BPF 'Code of practice for the survey and installation of windows and external doorsets'.

For windows under 1200 mm wide, frame fixings are generally only required up the jambs. For wider openings, it may be necessary to specify head and sill fixings.

Fasteners: Frames may be fixed using cramps, straps, screws or expanding bolts. Insert, e.g.
Stainless steel wood screws.
25 x 3 x 150 mm galvanized carbon steel frame cramps.
10 mm XYZ Ltd phosphor bronze expanding bolts.

BS 6510 requires the lugs, screws, or other materials necessary for fixing steel windows to be supplied by the window manufacturer.

The location of fixings may also be shown on the drawings for clarification.

780 Fixing of wood frames
- Standard: As section Z20.
- Fasteners: . . . . . .

Stainless steel wood screws
25 x 3 x 150 mm galvanized carbon steel frame cramps
10 mm phosphor bronze expanding bolts
  - Spacing: When not predrilled or specified otherwise, position fasteners not more than 150 mm from ends of each jamb, adjacent to each hanging point of opening lights, and at maximum 450 mm centres.

Other reference(s) cited:
NBS section Z20.

780–784
For guidance on site handling and installation of windows, see:
- BS 644, clause 5.7.
- BS 8213-4.
- SWA 'Specifier's guide to steel windows'.
- BPF 'Code of practice for the survey and installation of windows and external doorsets'.

For windows under 1200 mm wide, frame fixings are generally only required up the jambs. For wider openings, it may be necessary to specify head and sill fixings.
Fasteners: Frames may be fixed using cramps, straps, screws or expanding bolts. Insert, e.g.
Stainless steel wood screws.
25 x 3 x 150 mm galvanized carbon steel frame cramps.
10 mm XYZ Ltd phosphor bronze expanding bolts.
BS 6510 requires the lugs, screws, or other materials necessary for fixing steel windows to be supplied by the window manufacturer.
The location of fixings may also be shown on the drawings for clarification.

781 Fixing of steel frames
- Standard: As section Z20.
- Fasteners: . . . . . .

Stainless steel wood screws
25 x 3 x 150 mm galvanized carbon steel frame cramps
10 mm phosphor bronze expanding bolts
- Spacing: When not predrilled or specified otherwise, position fasteners not less than 50 mm and not more than 190 mm from ends of each jamb, adjacent to each hanging point of opening lights and at maximum 900 mm centres.

Other reference(s) cited:
NBS section Z20.

780–784
For guidance on site handling and installation of windows, see:
- BS 644, clause 5.7.
- BS 8213-4.
- SWA 'Specifier's guide to steel windows'.
- BPF 'Code of practice for the survey and installation of windows and external doorsets'.

For windows under 1200 mm wide, frame fixings are generally only required up the jambs. For wider openings, it may be necessary to specify head and sill fixings.
Fasteners: Frames may be fixed using cramps, straps, screws or expanding bolts. Insert, e.g.
Stainless steel wood screws.
25 x 3 x 150 mm galvanized carbon steel frame cramps.
10 mm XYZ Ltd phosphor bronze expanding bolts.
BS 6510 requires the lugs, screws, or other materials necessary for fixing steel windows to be supplied by the window manufacturer.
The location of fixings may also be shown on the drawings for clarification.

782 Fixing of aluminium frames
- Standard: As section Z20.
- Fasteners: . . . . . .

Stainless steel wood screws
25 x 3 x 150 mm galvanized carbon steel frame cramps
10 mm phosphor bronze expanding bolts
- Spacing: When not predrilled or specified otherwise, position fasteners not more than 250 mm from ends of each jamb, adjacent to each hanging point of opening lights, and at maximum 600 mm centres.

Other reference(s) cited:
NBS section Z20.

780–784
For guidance on site handling and installation of windows, see:
- BS 644, clause 5.7.
- BS 8213-4.
- SWA 'Specifier's guide to steel windows'.
- BPF 'Code of practice for the survey and installation of windows and external doorsets'.

For windows under 1200 mm wide, frame fixings are generally only required up the jambs. For wider openings, it may be necessary to specify head and sill fixings.
Fasteners: Frames may be fixed using cramps, straps, screws or expanding bolts. Insert, e.g.
Stainless steel wood screws.
25 x 3 x 150 mm galvanized carbon steel frame cramps.

783 Fixing of PVC-U frames
- Standard: As section Z20.
- Fasteners: . . . . . .

Stainless steel wood screws
25 x 3 x 150 mm galvanized cabon steel frame cramps
10 mm phosphor bronze expanding bolts
- Spacing: When not predrilled or specified otherwise, position fasteners 150–250 mm from ends of each jamb, adjacent to each hanging point of opening lights, but no closer than 150 mm to a transom or mullion centre line, and at maximum 600 mm centres.

10 mm XYZ Ltd phosphor bronze expanding bolts.

BS 6510 requires the lugs, screws, or other materials necessary for fixing steel windows to be supplied by the window manufacturer.

The location of fixings may also be shown on the drawings for clarification.

Other reference(s) cited:

NBS section Z20.

780–784

For guidance on site handling and installation of windows, see:

- BS 644, clause 5.7.
- BS 8213-4.
- SWA 'Specifier's guide to steel windows'.
- BPF 'Code of practice for the survey and installation of windows and external doorsets'.

For windows under 1200 mm wide, frame fixings are generally only required up the jambs. For wider openings, it may be necessary to specify head and sill fixings.

Fasteners: Frames may be fixed using cramps, straps, screws or expanding bolts. Insert, e.g.

Stainless steel wood screws.

25 x 3 x 150 mm galvanized carbon steel frame cramps.

10 mm XYZ Ltd phosphor bronze expanding bolts.

BS 6510 requires the lugs, screws, or other materials necessary for fixing steel windows to be supplied by the window manufacturer.

The location of fixings may also be shown on the drawings for clarification.

Other reference(s) cited:

NBS section Z20.

784 Fixing of composite frames

- Standard: As section Z20.
- Fasteners: . . . . . .

Stainless steel wood screws

25 x 3 x 150 mm galvanized carbon steel frame cramps

10 mm phosphor bronze expanding bolts

  - Spacing: When not predrilled or specified otherwise, position fasteners not more than 150 mm from ends of each jamb, adjacent to each hanging point of opening lights, and at maximum 600 mm centres.

790

There is often a gap of up to 12 mm between the back of a frame and the reveal into which it is fitted. This gap may be covered with architraves which, if they are at least 15 mm thick and closely fitted on both sides of the frame, may give up to 30 minutes integrity in a fire. If the fit of the architraves cannot be guaranteed, some form of seal must be used to fill the gap. This may be plaster, tightly packed mineral wool, or an intumescent mastic or tape. If architraves are not to be fitted, then plaster or intumescent mastic should be used. Even with closely fitting architraves, sealing will be necessary to give 60 minutes integrity.

790 Fire resisting frames

- Gap between back of frame and reveal: Completely fill with . . . . . .

intumescent mastic or tape

mineral wool, tightly packed

plaster

800

Use this clause for steel frames where the window opening is not rebated.

800 Backfilling of steel frame sections

- Windows fixed direct into openings: After fixing, fill back of steel frame with waterproof cement fillet.

810

Oil based sealants are commonly specified and are usually adequate when of good quality. They are not suitable for use with PVC-U windows or wood windows finished with microporous paints.

Solvent-based acrylic sealants are especially suitable for refurbishment work since they will adhere to surfaces that are difficult to clean. Water-based acrylics may be used externally if early exposure to rain is avoided.

Where weather conditions are severe (e.g. on high rise buildings), high grade sealants such as polysulfides and silicones should be used.

BS 6213 and BRE Information Paper 25/81 give guidance on types of joint sealant, their selection and application. Guidance on specification of sealants is given in section Z22. See also CIRIA

810 Sealant joints

- Sealant:
  - Manufacturer: . . . . . .

Contractor's choice

Submit proposals

Product reference: . . . . . .

Contractor's choice

Submit proposals

- Colour: . . . . . .
- Application: As section Z22 to prepared joints. Finish triangular fillets to a flat or slightly convex profile.

publication ‘Sealant joints in the external envelope of buildings’.

Where the joint is deep in comparison to its width a backing strip should be used to fill the inner portion of the joint, leaving the correct joint depth to accommodate the sealant. The sealant should have a minimum depth of 6 mm. The locations of backing strips should be shown on drawings if they are not required for all joints.

Mastic sealants are not recommended for vertical joints between wood windows and the adjacent reveals, because there is a risk that any moisture penetrating behind the seal may be trapped at the back of the frame and absorbed into the wood.

An alternative method, recommended by TRADA, is to replace the sealant with a precompressed impregnated foam tape. The tape expands to fill the joint, forming a waterproof but vapour permeable seal. A minimum 5 mm gap is generally required for such tapes. They can be concealed using a cover bead if desired.

820 Ironmongery

- Fixing: Assemble and fix carefully and accurately using fasteners with matching finish supplied by ironmongery manufacturer. Do not damage ironmongery and adjacent surfaces.
- Checking/ Adjusting/ Lubricating: Carry out at completion and ensure correct functioning.