BS 4873:2009

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Aluminium alloy windows and doorsets – Specification

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Contents

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Foreword

Publishing information

This British Standard is published by BSI and came into effect on 28 February 2009. It was prepared by Subcommittee B/538/1, *Windows*, and Subcommittee B/538/2, Doors, under the authority of Technical Committee B/538, *Doors, windows, shutters, hardware and curtain walling*. A list of organizations represented on these committees can be obtained on request to their secretary.

Supersession

This British Standard supersedes BS 4873:2004, which is withdrawn.

Relationship with other publications

The requirements and properties for aluminium window and door extrusions are specified in BS EN 755-1, BS EN 755-9, BS EN 12020-1 and BS EN 12020-2.

This British Standard is also related to the following standards.

- BS EN 14351-1 is the harmonized European product standard for windows and external pedestrian doorsets without resistance to fire and smoke leakage characteristics. It gives a list of performance characteristics and classifications of performance, but does not give guidance on determining the appropriate classification for any specific application.
- BS 6375 is the national application document in the UK, giving performance requirements and guidance for the selection of appropriate classes of performance from BS EN 14351-1.
- BS 8213-4 provides guidance on the survey and installation of replacement windows and external pedestrian doorsets.

Information about this document

This is a full revision of the standard, and introduces the following principal changes:

- changes taking into account the publication of the harmonized European standard BS EN 14351 to remove any conflict between the standards [1)];
- information on how the requirements relate to the European Construction Products Directive [1].

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

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1) At the time of publication of this edition of BS 4873, only BS EN 14351-1 has been published. Parts 2 and 3 are in preparation.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This British Standard specifies requirements for the design, construction and performance of aluminium alloy windows and glazed doorsets, solid or thermally improved, intended to be installed vertically (±15°), including constituent materials and glazing.

It applies to windows and doorsets fabricated in a factory, which can be in single or multi-light form, in coupled assemblies where appropriate, of the following types:

a) windows:

1) hinged: side-hung (open in or out), top-hung (open in or out), bottom-hung (open in or out), tilt before turn or turn before tilt;

2) projecting: side-hung (open out or reversible) and top-hung (open out or reversible);

3) pivoted: horizontal and vertical (hung centrally or off-centre including reversible);

4) sliding: horizontal and vertical (including tilting-in sash to vertical);

5) fixed lights;

6) louvred: adjustable;

b) doorsets:

1) single leaf single-swing doors (open in or out) with or without side lights and top panels;

2) double leaf single-swing doors (open in or out) with or without side lights and top panels;

3) single track sliding doors;

4) single track sliding folding doors.

It is applicable to assemblies in which any frame member is not longer than 3 m. It does not apply to curtain walls that span across horizontal structural members of floors but is applicable to windows fitted within a curtain walling system.

It is not applicable to:

1) secondary windows applied to convert existing single windows into double or coupled windows;

2) windows with frames designed to be glazed with security glazing conforming to BS 5544, BS EN 356 or BS EN 1063;

3) commercial style single- or double-swing doorsets using floor springs or concealed overhead closers or suspended sliding doors with overhead operating mechanisms.

NOTE Guidance on the evaluation of conformity is given in Annex A. Guidance on durability and recycling is given in Annex B.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 3987, *Specification for anodic oxidation coatings on wrought aluminium for external architectural applications*

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*

BS 6100-1 (BS ISO 6707-1), *Building and civil engineering – Vocabulary – Part 1: General terms*

BS 6100-6, *Building and civil engineering – Vocabulary – Part 6: Construction parts*

BS 6100-11, *Building and civil engineering – Vocabulary – Part 11: Performance characteristics, measurement and joints*

BS 6100-12, *Building and civil engineering – Vocabulary – Part 12: Plant, equipment and persons*

BS 6262 (all parts), *Glazing for buildings*

BS 6375-1, *Performance of windows and doors – Part 1: Classification for weathertightness and guidance on selection and specification*

BS 6375-2, *Performance of windows and doors – Part 2: Classification for operation and strength characteristics and guidance on selection and specification*

BS 6375-3, *Performance of windows and doors – Part 3: Classification for additional performance characteristics and guidance on selection and specification*

BS 6399-2, *Loading for buildings – Part 2: Code of practice for wind loads*

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*

BS 8000-7, *Workmanship on building sites – Part 7: Code of practice for glazing*

BS EN 485-2:2007, *Aluminium and aluminium alloys – Sheet, strip and plate – Part 2: Mechanical properties*

BS EN 755-9:2008, *Aluminium and aluminium alloys – Extruded rod/bar, tube and profiles – Part 9: Profiles, tolerances on dimensions and form*

BS EN 1279 (all parts), *Glass in building – Insulating glass units*

BS EN 1670:2007, *Building hardware – Corrosion resistance – Requirements and test methods*

BS EN 12020-2:2008, *Aluminium and aluminium alloys – Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 – Part 2: Tolerances on dimensions and form*

BS EN 12206-1, *Paints and varnishes – Coating of aluminium and aluminium alloys for architectural purposes – Part 1: Coatings prepared from coating powder*

BS EN 12373-1, *Aluminium and aluminium alloys – Anodizing – Part 1: Method for specifying decorative and protective anodic oxidation coatings on aluminium*

BS EN 13141-1, *Ventilation for buildings – Performance testing of components/products for residential ventilation – Part 1: Externally and internally mounted air transfer devices*

BS EN 13142, *Ventilation for buildings – Components/products for residential ventilation – Required and optional performance characteristics*

BS EN ISO 9227, *Corrosion tests in artificial atmospheres – Salt spray tests*

BS ISO 11600, *Building construction – Jointing products – Classification and requirements for sealants*

3 Terms and definitions

For the purposes of this British Standard, the terms and definitions given in BS 6100-1, BS 6100-6, BS 6100-11, BS 6100-12 and the following apply.

3.1 bearing device
wheel, roller, skid or other device fitted at the head or sill of a horizontally sliding window to support the mass of the sash and to facilitate movement

3.2 casement
framed opening window light that is hinged or pivoted

3.3 coupled window
glazed frame with another glazed frame hinged or fastened to it, so that both open together for ventilation and can be separated for cleaning purposes

3.4 door leaf
moving element within a doorset

3.5 doorset
complete unit, as installed, comprising door leaf, door frame, any associated side panels and/or top lights, and any operating hardware, locks and accessories

NOTE This is also known as a door assembly.

3.6 double window
window comprising two separate glazed frames superimposed in the same wall opening

3.7 fixing
component that is used to secure separate parts of a window assembly or doorset to each other, to secure an item of hardware to a window or door part, or to secure a completed window assembly or doorset into the structure of a building.

NOTE Screws, machine screws, washers and rivets are often referred to as fasteners.

3.8 frame
part of a window or doorset surrounding the moving element(s) and to which the moving element(s) are connected

3.9 glazing gasket
plastic or synthetic rubber member, used between the glazing and the frame and/or between the glazing and the glazing bead

3.10 hardware
device attached to a structural member of a window or doorset to facilitate opening, closing or making the product secure

3.11 insulating glass unit
assembly consisting of at least two panes of glass, separated by one or more spacers, hermetically sealed along the periphery, mechanically stable and durable
[BS EN 1279-1]

NOTE Systems are available where the spacer and hermetic seal are included within a single edge sealing system.

3.12 multi-light window
window incorporating two or more lights, opening and/or fixed, within one perimeter frame

3.13 sash
framed opening light that slides

3.14 secondary window
window either fitted into the same wall opening as an existing window, or applied to an existing window, to provide improved thermal and/or sound insulation

3.15 ventilation device
ventilator other than an opening light incorporated into a window or doorset

NOTE 1 A permanent ventilation device provides continuous ventilation. A controlled device can be closed and may be adjusted to provide ventilation.

NOTE 2 A ventilation device is referred to as an "air transfer device" in BS EN 13142 and is frequently referred to as a "trickle ventilator" or "background ventilator" in the UK.

3.16 weathertightness
performance in respect of air permeability, watertightness and wind resistance

3.17 weatherseal
resilient material designed to reduce air infiltration and water penetration

NOTE This is sometimes called a weatherstrip

4 Handing

The handing shall be in accordance with the specification provided.

Where the manufacturer is specifying the handing, the specification shall conform to Annex C.

NOTE Where the manufacturer is not specifying the handing, care should be taken to check the handing designation. See Annex C, Note 1.

5 Components

5.1 Aluminium extrusions and sheet products

Extruded aluminium profiles shall be fabricated from designated alloys 6060 or 6063 in tempers T4, T5 or T6 conforming to BS EN 755-9:2008 or BS EN 12020-2:2008.

When ancillary components such as sills, couplings etc. are formed from sheet materials they shall be fabricated from designated alloys 1200, 3103, 5005 or 5251 conforming to BS EN 485-2:2007 in temper suitable for the particular type of application and degree of forming to be adopted.

The aluminium profiles used in the construction of the frames excluding glazing beads, nibs, interlocks and similar features shall be not less than 1.2 mm thick.

NOTE This dimension takes into account any tolerances specified in the product standards or elsewhere.

The aluminium shall be finished by one of the following:

a) anodizing conforming to BS 3987 or BS EN 12373-1;

b) a liquid organic coating conforming to BS 4842;

c) a powder coating conforming to BS 6496 or BS EN 12206-1.

5.2 Frame joint sealing materials

When the completed window is tested in accordance with BS 6375-1 and BS 6375-2, there shall be no degradation of the sealing or the operational function of the window due to failure of the sealing materials.

NOTE Materials should be able to withstand stresses during assembly, transportation, installation and operation of the window.

5.3 Bearing devices and hardware

Metallic materials used for bearing devices and hardware shall have at least the equivalent corrosion resistance to BS EN 1670:2007, grade (class) 3 (96 h) when subjected to a neutral salt spray test as specified in BS EN ISO 9227. Tests shall be carried out on complete hardware items as supplied.

NOTE 1 For environments in very polluted localities such as those subject to combinations of industrial and coastal pollution, BS EN 1670:2007, class 4 should be used.

NOTE 2 Requirements and test methods for hardware materials are specified in BS EN 13126.

5.4 Weatherseals

Weatherseals shall be made of one of the following:

a) ethylene propylene diene monomer (epdm); or

b) plasticized PVC (PVC-P); or

c) polychloroprene (CR); or

d) polypropylene pile; or

e) sheathed cellular elastomeric polymer; or

f) silicone (Si); or

g) thermoplastic elastomer (TPE).

NOTE 1 Non-cellular forms of materials a), b) and c) are specified in BS 4255-1.

NOTE 2 BS EN 12365-1 gives performance requirements for weatherseals.

Glazing compounds shall be non-setting compounds, preformed mastic tapes, gun grade solvent release type sealants, one-part or two-part curing sealants or two-part rubberizing compounds. Gun grade sealants shall conform to BS ISO 11600.

5.5 Fixings

All straps, clips, brackets, lugs, and similar fixing devices and their attendant screws, bolts etc. shall be capable of meeting the applied wind and operational loads and shall achieve a minimum corrosion resistance of grade 3 (96 h) as specified in BS EN 1670:2007.

NOTE 1 Screws, nuts, bolts, rivets, metal washers, shims and other fixings should be tested in the "as used" condition.

NOTE 2 Spacer shims used at fixings, which serve only as packing and do not influence the structural integrity of the fixing, may be of extruded or moulded plastics material.

NOTE 3 Austenitic stainless steel is the preferred material for fixings subject to external forces and corrosive influences.

5.6 Glazing materials

Glass thickness and type shall be selected using the recommendations given in BS 6262-1, BS 6262-2, BS 6262-3, BS 6262-4 and/or BS 6262-7, as appropriate, to withstand the design wind pressure calculated in accordance with BS 6375-1 or BS 6399-2.

The exposed edges of glass adjustable louvre blades shall be arrised, ground or polished.

Insulating glass units shall conform to BS EN 1279.

6 Construction and design

NOTE The accessible parts of finished windows should as far as reasonably practicable be free from all sharp edges, burrs etc.

6.1 Work sizes

The work sizes for overall length and height shall be documented.

6.2 Manufacturing tolerances

The size of an assembled frame shall be within ±1.5 mm of the documented work size (**6.1**) in any dimension, and the difference between the diagonals of the assembled frame shall be not more than 4 mm.

6.3 Design for glazing

The frame design shall be such that:

a) the window can be glazed in accordance with BS 6262;

b) reglazing is possible without the need to remove the outer frame from the structure of the building;

c) it is possible to renew the weatherseals without removing the outer frame from the structure of the building;

d) it is possible to replace the hardware without removing the outer frame from the structure of the building.

6.4 Openable windows and doors

For windows and doors that are intended to be openable, the opening sashes or door leaves however designed shall move freely and smoothly without hindrance throughout their intended range of movement.

In horizontally and vertically sliding windows and sliding doors, adjacent aluminium members shall not slide upon each other.

In horizontally sliding windows and sliding doors, the sashes or door leaves shall be supported on bearing devices that facilitate movement and prevent direct contact between the sashes and the aluminium tracks.

In vertically sliding windows, the mechanism or balancing device shall be accessible for adjustment, repair or replacement, after the windows have been installed.

6.5 Frame joints

Joints in frames shall be made either by welding or by mechanical means (e.g. cleating, screwing and gluing) and shall have flush, stepped or lapped surfaces. For flush joints formed by mechanical means, any deviation from the same plane shall be within the limits set by the use of extrusion tolerances given in BS EN 755-9 or BS EN 12020-2.

NOTE The use of "L" shaped plates (chevrons) in mitred joints can help achieve the required finish, and the weather performance of metal-to-metal joints will benefit from the application of suitable sealing compounds during manufacture.

Welded joints shall be cleaned off smooth on surfaces that are exposed when the window is in the closed position and where the joints would otherwise project into the glazing space.

7 Glazing

Windows and doorsets shall be glazed in accordance with the recommendations given in the relevant part of BS 6262 and BS 8000-7.

NOTE Attention is drawn to the glazing safety recommendations of BS 6262-4, particularly the requirements for marking the glass.

8 Use, cleaning and maintenance

Guidance on the use, cleaning and maintenance of aluminium windows and doorsets shall be provided by the manufacturer.

9 Security

NOTE Guidance on security against crime is given in BS 8220.

9.1 Basic security

When a completed window is subjected to the basic security test specified in BS 6375-3, it shall not be possible to gain entry.

9.2 Enhanced security

When enhanced security is required, windows shall conform to BS 6375-3.

10 Safety in case of fire

10.1 Fire resistance

Where fire resistance forms part of the requirements, it shall be declared in accordance with BS 6375-3.

10.2 Reaction to fire

Where reaction to fire forms part of the requirements, it shall be declared in accordance with BS 6375-3.

NOTE Aluminium is rated as Class A1 by the European Commission.

11 Safety in use

NOTE BS 8213-1 gives guidance on the safety in use and in cleaning of windows and door height windows.

11.1 Impact resistance

Where impact resistance forms part of the requirements, it shall be declared in accordance with BS 6375-2.

11.2 Safety devices

Any safety devices shall conform to the requirements specified in BS 6375-2.

11.3 Emergency exit and panic devices

Any emergency exit devices or panic devices shall conform to the requirements specified in BS 6375-3.

12 Weathertightness

The completed window shall meet the weathertightness requirements for the appropriate classification specified in BS 6375-1, when tested in accordance with BS 6375-1 and, for double windows, with the appropriate additional procedure given below.

a) For air permeability, double windows shall be tested with both windows closed, the length of opening joint being that which is visible on the inner surface of the inner window only.

b) For watertightness, double windows shall be tested with both windows closed and the performance class shall be that obtained by the outer windows.

c) For wind resistance, double windows shall be tested with the inner window open and the outer window closed. The test shall then be repeated with the inner window closed and, if the outer window contains opening light(s), this (they) shall be opened.

13 Operation and strength characteristics

Operation and strength characteristics shall be declared in accordance with BS 6375-2.

14 Hygiene, health and the environment

NOTE 1 This clause is relevant to Essential Requirement 3 of the Construction Products Directive [1].

NOTE 2 There is a requirement in BS EN 14351-1 for the manufacturer to declare if there is a risk of any potentially dangerous substances being released from the product during normal intended use.

The performance of any ventilation device (see **3.15**) mounted within the window or doorset shall be classified in accordance with BS EN 13142 when tested in accordance with BS EN 13141-1.

15 Acoustic performance

When specified, acoustic performance shall be declared in accordance with BS 6375-3.

16 Energy conservation

The U value shall be declared in accordance with BS 6375-3.

NOTE When used, Window Energy Ratings should be certified by the British Fenestration Council Ltd (BFRC) [2)].

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2) 44–48 Borough High Street, London SE1 1XB. Telephone 020 7403 9200. Website http://www.bfrc.org.

17 Marking

Each window or door shall be identified with the following information:

a) the number and date of this British Standard i.e. BS 4873:2009 [3)];

b) claimed performance classifications;

c) the name or trademark of the manufacturer or other means of identifying the manufacturer;

d) means of traceability.

The identification shall be affixed:

- to any suitable part of the product; or
- on an attached label; or
- on its packaging; or
- on the accompanying commercial documents; or
- on the manufacturer's website; or
- in the manufacturer's published technical specifications.

3) Marking BS 4873:2009 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third-party certification of conformity.

Annex A (informative) Guidance on the evaluation of conformity

A.1 Selection of samples for type approval

When considering a product range of windows or doorsets for testing and approval with a view to selecting representative samples, the following aspects should be taken into account:

a) the size of the window:

1) largest area top-hung with the longest length;

2) largest area side-hung with the tallest height;

3) maximum area fixed light for the weathertightness classification being considered;

4) maximum area casement multi-light with the longest continuous mullion/transom for the weathertightness classification being considered;

5) maximum area tilt before turn or turn before tilt;

6) maximum area tilt before turn or turn before tilt multi-light with longest continuous mullion or transom for the weathertightness classification being considered;

7) largest area horizontal pivot with longest width;

8) largest area vertical pivot with tallest height;

NOTE 1 If an offset pivot is available, this should be selected instead of a centre pivot. A centre pivot window should be selected to represent windows with an opening ratio of two thirds to one third.

9) maximum area horizontal slider with the tallest height;

10) maximum area vertical slider with longest length;

b) the size of the doorset:

1) maximum area hinged doorset with longest width;

2) maximum area sliding or sliding/folding doorset with tallest height;

c) internal/external beaded systems;

d) glazing – consider window having double glazed unit of maximum area for wind loading classification being considered;

e) single or multi-point locking and various other systems;

NOTE 2 When considering single lights with multi-point locking systems, take the greatest value of opening perimeter divided by the total number of locking points.

f) hingeing and roller systems/suppliers;

g) other supporting hardware used to support the weathertightness/ mechanical performance.

NOTE 3 All of these details should be made available in the manufacturer's fabrication manual.

A.2 Testing schedule

Type tests in accordance with this British Standard should be carried out initially (i.e. at first assessment of the range) and at significant changes to the window or doorset construction.

Annex B (informative) Durability and recycling

B.1 General

The durability of aluminium windows and doorsets is affected by:

- the specification of the framing, glazing and associated materials;
- the specification of the hardware used;
- the quality of manufacture and assembly;
- the quality of the installation;
- the use and abuse;
- the maintenance of the products.

Because of these variables, actual performance can vary in use such that any figures given for service life can only be general estimates. Such figures bear no relationship to warranties given by the manufacturer(s).

A window is considered to have failed when it is no longer possible to repair or replace components or hardware, and the physical integrity has been lost.

B.2 Components

B.2.1 Frames

Aluminium extrusions finished in accordance with BS 3987, BS 6496 or BS EN 12206-1 only need an annual wipe down with warm soapy water to maintain their pristine appearance, unless in an area of high salt or industrial contamination when extra cleaning will be needed.

Where window frames are thermally improved by the inclusion of an insulating barrier or cladding, the insulating material should be stable under the conditions of service, e.g. under wind and dead loads and within the likely surface temperature range of the frames.

The thermal barrier or cladding system should be sufficiently robust to withstand tests carried out in accordance with BS 6375-1 and BS 6375-2.

NOTE 1 BS 6375 specifies performance requirements for the strength of windows based on a series of mechanical tests that check the integrity of the frame.

The thermal barrier may be of polyurethane resin (for poured-in-place systems), neoprene extrusions, or PVC-U, nylon, polypropylene or polyamide extrusions, used with rigid foam plastics. The thermal cladding may be of PVC-U or rigid foam PVC extrusions.

NOTE 2 Requirements for thermal barriers are specified in BS EN 14024.

Aluminium alloy products have been used and are still fitted in buildings more than 60 years old; windows and doorsets that conform to this British Standard can be expected to last that length of time under normal usage conditions.

For aluminium/timber composites and timber surrounds, the aluminium element should conform to the requirements specified in this British Standard. The timber element should conform to the following guidance.

If timber sections are used, either as a surrounding frame or as part of the window frame, they should conform to BS EN 942 and the

workmanship to BS 1186-2. The materials used in their preservation treatment should have no harmful effects on aluminium in contact with the treated timber.

There should be no direct contact between mill finish aluminium and oak, sweet chestnut or western red cedar because of the acid content in the timbers.

NOTE 3 For a full description of the requirements for the selection, fabrication and installation of timber windows, see BS 644.

B.2.2 Insulating glass units (IGU)

Insulating glass units manufactured in accordance with BS EN 1279 can last in excess of 20 years if they are correctly glazed into the frame. Insulating glass units can be replaced without removing the outer frame from the fabric of the building.

B.2.3 Glazing gaskets and weatherseals

Glazing gaskets and weatherseals manufactured in accordance with BS 4255-1 or BS EN 12365-1, when correctly applied, ensure the weathertightness of the window or door. Over time, the performance of glazing gaskets and weatherseals generally declines. Glazing gaskets and weatherseals generally need replacing after 10 to 20 years. They can be replaced without removing the outer frame from the fabric of the building. Whilst it might prove impossible or impractical to replace glazing gaskets and weatherseals with exact replicas, most gasket manufacturers carry a sufficiently wide range of gaskets to ensure that a near match can be achieved which enables the performance of the window to be maintained.

B.2.4 Hardware and fixings

Hardware is generally designed and supplied to perform a particular function at a specific performance level. Many items are unique to a system and even a profile, so care needs to be taken when ordering replacements, particularly when a product has been discontinued. Always choose hardware made from materials that can cope with the actual conditions: for example, marine, swimming pool and some industrial environments are more demanding and higher grade materials, such as austenitic stainless steel, and enhanced finishes are recommended.

Fixings should be correctly chosen with due note taken of the environment and their intended usage. Stainless steel fixings are generally preferred for aluminium products.

B.3 Installation and maintenance

Correct installation is essential in ensuring adequate weather performance. BS 8213-4 gives guidance on the survey and installation of windows and doorsets in dwellings, but the principles are valid for most types of buildings. CAB publications *Setting the Standard* No. 2 (windows) [2] and No. 5 (doorsets) [3] also contain useful information on installation.

Regular maintenance in accordance with the manufacturer's and/or systems company's recommendations will ensure that product performance, appearance and durability are maximized (see Clause **8**).

B.4 Recycling

Aluminium windows and doorsets can and should be recycled at the end of their life. In-process aluminium scrap is also a valuable commodity and should be collected and returned to a suitable remelting facility.

The aluminium components are fully recyclable, back to the original material specification if desired, with very small losses, low energy input and minimal greenhouse gas output, thus every effort should be made to ensure their collection and return to a suitable refiner.

Glass, gasket material and PVC-U trims can also be recycled.

Annex C (normative) Specification for handing

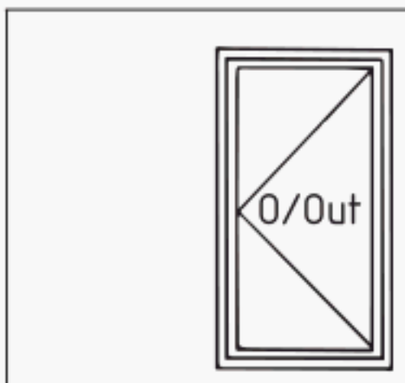
In specifying the handing it shall be stated whether the window or doorset is viewed from the outside or the inside. For a multi-light window, the arrangement of the multi-light shall be shown on a diagram.

The proportion opening outwards of a vertically pivoted window shall be stated.

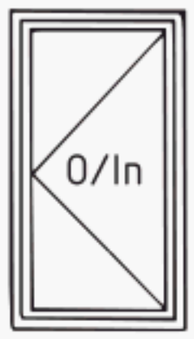
NOTE 1 Drawing conventions for window and doorset types are illustrated in Figure C.1. The European designations (BS EN 12519) are significantly different and care should be taken to establish which is being used.

NOTE 2 Secondary windows are usually identified viewed from the inside.

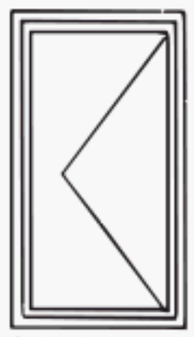
Figure C.1 **UK drawing conventions for window and door types**



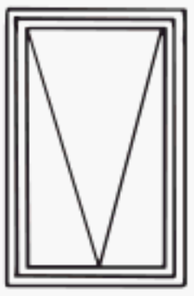
Side-hung left-hand open out



Side-hung left-hand open in



Projected side-hung left-hand



Bottom-hung

Horizontal pivot

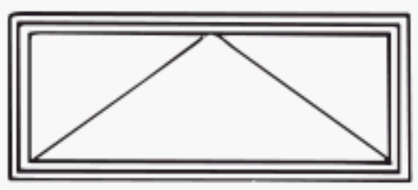
Horizontal pivot reversible

Vertical pivot right-hand
two-thirds open out

Vertical centre pivot right-hand
left half open out

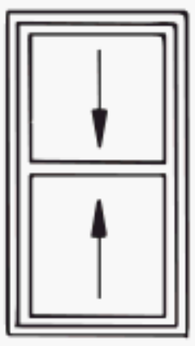
Vertical pivot right-hand
one-third open out

Vertical centre pivot reversible
right-hand left half open out

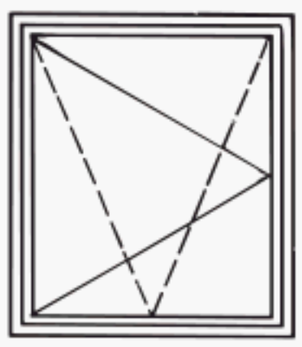


Top-hung

Projected top-hung
(includes reversible type)

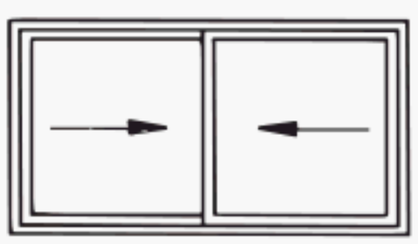


Vertical slider

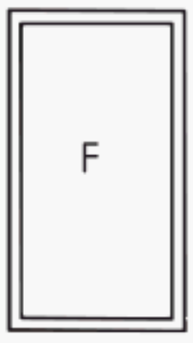


Tilt and turn right-hand

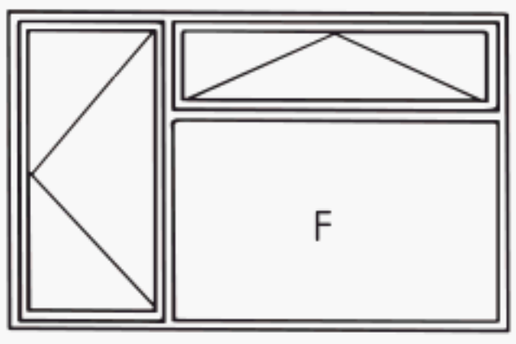
Adjustable louvre



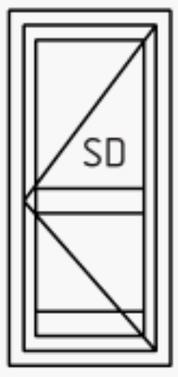
Horizontal slider



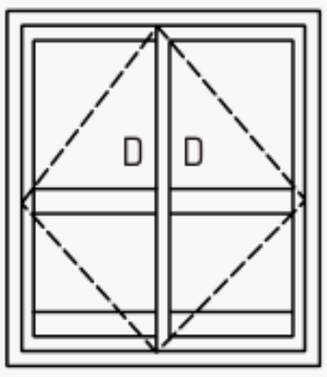
Fixed light



Left-hand multi-light



Single-leaf door
left-hand open out



Double-leaf door open in
left-hand first opening leaf

NOTE Elevations viewed from outside.

Bibliography

Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 644, *Timber windows – Fully finished factory-assembled windows of various types – Specification*

BS 1186-2, *Timber for and workmanship in joinery – Part 2: Specification for workmanship*

BS 4255-1, *Rubber used in preformed gaskets for weather exclusion from buildings – Part 1: Specification for non-cellular gaskets*

BS 5544, *Specification for anti-bandit glazing (glazing resistant to manual attack)*

BS 8213-1, *Windows, doors and rooflights – Part 1: Design for safety in use and during cleaning of windows, including door-height windows and roof windows – Code of practice*

BS 8213-4, *Windows, doors and rooflights – Part 4: Code of practice for the survey and installation of windows and external doorsets*

BS 8220 (all parts), *Guide for security of buildings against crime*

BS EN 356, *Glass in building – Security glazing – Testing and classification of resistance against manual attack*

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BS EN 14351-1, *Windows and pedestrian doorsets – Product standard, performance characteristics – Part 1: Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics* [4)]

4) Parts 2 and 3 are currently in preparation.

Other publications

[1] EUROPEAN COMMUNITIES. 89/106/EEC Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products. Luxembourg: Office for Official Publications of the European Communities, 1988.

[2] COUNCIL FOR ALUMINIUM IN BUILDING. *Aluminium windows – A guide to the specification and design*. StS 2. Stonehouse, Gloucestershire: Council for Aluminium in Building, 1999. [5)]

[3] COUNCIL FOR ALUMINIUM IN BUILDING. *Aluminium doors and entrance screens – A guide to specification and design*. StS 5. Stonehouse, Gloucestershire: Council for Aluminium in Building, 2004. [5)]

5) The CAB publications are expected to be revised in due course. When the new editions are available, they should be referred to instead of the editions listed here.

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