

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**

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Committees responsible for this British Standard

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- Association of Building Engineers
- Association of Building Manufacture
- British Plastics Federation
- British Wood Preserving and Damp-Proofing Association
- British Woodworking Federation
- Building Research Establishment
- Centre for Window and Cladding Technology
- Construction Fixing Association
- Consumer Policy Committee of BSI
- Council for Aluminium in Building
- Flat Glass Manufacturers' Association
- Glass and Glazing Federation
- Guild of Architectural Ironmongers
- Health and Safety Executive
- LHC Building Components and Services
- National House Building Council
- Police Scientific Development Branch
- Royal Institute of British Architects
- Scottish Office — Construction and Buildings
- Society of Chief Architects of Local Authorities
- Steel Window Association
- Timber Research and Development Association

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Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 General principles	3
5 Design for safety in use	4
6 Means of escape from fire	9
7 Security from unauthorized entry	10
8 Design for safety when cleaning	10
9 Maintenance	11
Annex A (informative) Reach capabilities	12
Annex B (normative) Safety restrictors	15
Annex C (normative) External and internal glazing at height: Design for safe cleaning and maintenance	16
Annex D (normative) Safe use of ladders	19
Bibliography	20
Figure A.1 — Shoulder (acromion) to grip	13
Figure A.2 — Overhead grip reach	14
Table 1 — Window types: risks in use and when cleaning the outside of the window from inside	5
Table A.1 — Reach capabilities for the UK adult population (under age 65)	12

Foreword

This part of BS 8213 has been prepared under the direction of Technical Committee B/538. It supersedes BS 8213-1:1991, which is withdrawn.

In this revision, a risk assessment approach to window design is recommended. Greater emphasis has been placed upon the use of safety restrictor devices to limit the initial opening of windows to minimize the risks of persons falling out of open windows.

NOTE 1 Attention has been drawn to these needs following a number of incidents where fatalities have occurred due to the lack of suitable fittings.

A clause on security (Clause 7) has been added to cover related safety issues.

The guidance given in this standard is in addition to legislative requirements, which take precedence, and is suitable for new buildings and for upgrading and refurbishment works. It is aimed at all those involved in the specification, design, selection and use of windows, including public authorities, house-builders, architects, surveyors, window designers, window installers, glazing contractors and building owners. It may also be useful to building occupiers.

The guidance is primarily intended for use in residential accommodation, but many of the recommendations are applicable to other building types, to which health and safety legislation applies (see Note 2).

Attention is drawn to the fact that statutory legislation such as the Building Regulations 2000 [1] (applicable to England and Wales), the Building Standards (Scotland) Regulations 1990 [2], and the Building Regulations (Northern Ireland) 1994 [3] might impose requirements in certain circumstances. Planning or other constraints in some situations might necessitate special provisions for cleaning and safety.

All involved in the design and installation of windows need to be aware of the Construction (Design and Management) Regulations 1994, as amended by the Management of Health and Safety at Work Regulations 1999 and the Construction (Design and Management) (Amendment) Regulations 2000 [4]. These require designers, in a very broadly defined sense of the term, to minimize foreseeable risks to people doing the work or people affected by the work from any project arising from building maintenance and cleaning.

Guidance for professional window cleaners is prepared by the Health and Safety Executive and is listed in the Bibliography. The recently adopted Directive on Temporary Work at Height [5] will be implemented through new regulations governing all such work including that of window cleaners.

NOTE 2 The Workplace (Health, Safety and Welfare) Regulations 1992 [6] contain specific safety requirements which apply to window safety, in particular regulation 14 on the risk of injury from breakage of windows, regulation 15 on safety in opening, closing and adjusting windows and regulation 16 which requires that all windows are designed and constructed so that they can be cleaned safely. The Health and Safety Executive Workplace (Health, Safety and Welfare) Regulations 1992 Approved Code of Practice and Guidance 1992 L24 [7] on these Regulations gives guidance.

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As a code of practice, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

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 does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 21 and a back cover.

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1 Scope

This part of BS 8213 gives recommendations on the design, construction, operation and maintenance of windows, including door height windows, for safety in use and during cleaning, including safe opening characteristics and the arrangement of window controls, to safeguard occupants and passers-by. The recommendations for safety for windows also apply to roof windows, where relevant. Guidance on safety for rooflights is excluded from this document.

Annex A gives examples of reach capabilities. Annex B gives recommendations on safety restrictors. Annex C sets out basic guidance on design for safe cleaning and maintenance of external and internal glazing at height. Annex D sets out recommendations for safe working practices in the use of portable ladders where necessary, after assessment of the use of the other methods of safe temporary access given in Annex C.

NOTE This code of practice is not intended to offer comprehensive guidance for maintenance and redecoration of windows, where more specific safety measures are required.

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 4873, *Aluminium alloy windows*.

BS 5974, *Code of practice for temporarily installed suspended scaffolds and access equipment*.

BS 6037, *Code of practice for the planning, design, installation and use of permanently installed access equipment — Suspended access equipment*.

BS 6100-1.3.5, *Glossary of building and civil engineering terms — Part 1: General and miscellaneous — Section 1.3: Parts of construction works — Subsection 1.3.5: Doors, windows and openings*.

BS 6100-1.3.6, *Glossary of building and civil engineering terms — Part 1: General and miscellaneous — Section 1.3: Parts of construction works — Subsection 1.3.6: Jointing products, builders' hardware and accessories*.

BS 6180, *Barriers in and about buildings — Code of practice*.

BS 6375-2, *Performance of windows — Part 2: Specification for operation and strength characteristics*.

BS 6399-1, *Loading for buildings — Part 1: Code of practice for dead and imposed loads*.

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

BS 644, *Timber windows — Factory assembled windows of various types — Specification*.

BS 6510, *Specification for steel windows, sills, window boards and doors*.

BS 7412, *Plastics windows made from unplasticized polyvinyl chloride (PVC-U) extruded hollow profiles — Specification*.

BS EN 364, *Personal protection equipment against falls from a height — Test methods*.

BS EN 795, *Protection against falls from a height — Anchor devices — Requirements and testing*.

BS EN 1670, *Building hardware — Corrosion resistance — Requirements and test methods*.

BS EN 13049, *Windows — Soft and heavy body impact — Test method, safety requirements and classification*.

DD CEN/TS 13126-1:2004, *Building hardware, fittings for windows and door height windows — Part 1: Requirements and test methods — Requirements common to all types of fittings*.

DD CEN/TS 13126-5:2004, *Building hardware, fittings for windows and door height windows — Part 5: Requirements and test methods — Devices that restrict the opening of windows*.

3 Terms and definitions

For the purposes of this British Standard, the terms and definitions given in BS 6100-1.3.5 and BS 6100-1.3.6, and the following apply.

NOTE Some of the terms given in BS 6100 have been replicated for convenience.

3.1

accessible opening light

opening light, any part of which is 1 500 mm or less above floor level

3.2

arris edge

small bevel of width not exceeding 1.6 mm at an angle of approximately 45° to the surface of the glass

3.3

configuration

width and height, including from floor level, of a window light or assembly of lights (fixed and opening)

3.4

coupled light

two superimposed lights that form a single opening light and can be separated for cleaning

3.5

design

consideration of one or more of the following: location, configuration, dimensions, specification and product selection

3.6

designer

person/s responsible for design

3.7

door height window

window that allows access or passage for pedestrians

3.8

light

individual glazed unit of a window

3.9

opening light

light that opens

3.10

retaining catch

device to retain an opening light firmly in an open position

3.11

reversing catch

device that automatically engages when an opening light is fully opened into a reversed position and holds the light firmly in that position until released by deliberate action

3.12

roof window

construction for closing an opening in the plane of a pitched roof that admits light and might admit fresh air

3.13**rooflight**

construction for closing an opening in a flat roof or low pitched roof intended primarily for lighting and consisting of a frame and glazing

3.14**safety restrictor (restricted opening device)**

mechanical device which is intended to limit the initial movement of an opening light so that a clear opening of not more than 100 mm is achieved at any point

3.15**secondary window**

inner window where two separate windows are superimposed in the same opening

4 General principles**4.1 Essential considerations**

Windows are generally installed to provide natural light and ventilation. These functions should be satisfied together with full consideration of the need for:

- a) design for safety in use (see Clause 5);
- b) means of escape from fire (see Clause 6);
- c) security from unauthorized entry (see Clause 7);
- d) design for safety when cleaning (see Clause 8);
- e) maintenance (see Clause 9).

4.2 Risk assessment

A risk assessment should be carried out, taking account of the relative priority needs established in each situation. For instance, unauthorized entry is not normally a risk with windows to the first floor and above unless there is a ready means of external access (see 7.2). Falls, however, even from relatively low heights, can have serious consequences.

The risk assessment should take into account the type of occupancy and age range of both occupants and visitors to a building, where this can reasonably be predicted. One example might be young children visiting older people in sheltered accommodation and using furniture to gain access to windowsills.

If a significant change of use of the building occurs, the risks should be reassessed.

A written record of the risk assessment signed by the client and the designer should be retained with the window documentation. This should be kept with the Health and Safety File where appropriate, or passed to purchasers, and a copy kept by the contractors responsible for the design. The responsibility for the risk assessment should lie with the designer.

NOTE In the case of domestic replacement windows the designer is the person or organization taking the order from the client.

4.3 Inclusive design

When designing windows they should be operable by as wide a range of the appropriate population as reasonably possible.

NOTE 1 Appropriate populations normally exclude young children.

NOTE 2 BS 8300:2001 gives guidance on various aspects of inclusive design.

5 Design for safety in use

5.1 Basis of design

Windows should be easy to operate, open safely without being a hazard to passers-by, and minimize the risk of falling through. The design of the windows including their location within the building, overall dimensions, opening types, and heights of sill and opening lights above ground or floor level can have important consequences and should be carefully determined. Safe use depends on:

- window location (see 5.2);
- window type (see 5.3);
- safety fittings (see 5.4);
- guarding (see 5.5);
- window construction and installation (see 5.6).

5.2 Window location

Safe access should be provided for window operation and cleaning. Particular care should be taken when designing windows for rooms incorporating built-in fixtures such as kitchen or bathroom fittings, which might restrict access.

NOTE 1 Fixtures in front of windows can also provide a platform for children to climb onto, enabling them to reach a window, with consequent risk.

NOTE 2 Windows on upper floors that can be safely cleaned from the inside allow for possible future extensions below, such as conservatories.

Appropriate types and configuration of windows should be provided to help to reduce vertigo-related problems, such as the choice of narrower, inward-opening lights with external guarding to 1 100 mm above floor level.

NOTE 3 Some people can suffer vertigo-related problems induced whilst using or cleaning an opening light or fixed sub-light in windows on higher floors.

When windows are located where it is difficult to provide safe access from inside, e.g. on a staircase, consideration should be given to providing a window type that allows for the inside to be safely cleaned from the outside. The recommendations in Annex C should be followed for methods of safe temporary access; access by ladder should only be considered after assessing the use of these methods. This also applies in situations where there might be high level windows or fixed lights where access from either inside or outside is necessary. Where a portable ladder is used, suitable and secure anchorages should be provided, along with instructions to the owner and occupier on inspection and maintenance (see Annex C).

The recommendations in Annex D should be followed on safe use of ladders.

Open windows projecting externally beyond the outer face of a building at or below 2 m above adjacent ground level are a potential hazard; pedestrian traffic should be directed around them by means of barriers, deterrent surfaces or planting. Projecting windows should be avoided in public circulation areas such as communal access balconies.

When designing windows and associated hardware in communal areas such as stairways and deck accesses advice from the relevant local fire authorities should be sought.

5.3 Window type

5.3.1 General

A summary of window types is given in Table 1, including recommendations on appropriate safety fittings together with comments on risks in use and during cleaning.

All windows that open inwards or reverse for cleaning should be fitted with catches, automatically engaging wherever possible, to secure them when so positioned.

The type and configuration of the windows, including associated hardware, should take into account wind-loading and any wind-gusting that might occur.

Care should be taken to ensure that blinds, curtains, pelmets and other fixtures do not prevent the correct operation of windows, especially when cleaning.