Department of
Finance and
Personnel
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Building Regulations (Northern Ireland) 2011

Proposed Guidance Edition

of

Technical Booklet V

Glazing
(draft for consultation)

July 2010

Note

1. **Proposed new text is marked in red.**

2. **Existing text to be deleted is struck through.**

3. **Page numbers in the Contents have not been inserted at this stage.**

4. **For the purposes of guidance the word "shall" has generally been replaced with the word "should". This has not been highlighted.**

Contents

Introduction

The Technical Booklets

This Technical Booklet is one of a series that has been prepared by the Department of Finance and Personnel (the Department) for the purpose of providing practical guidance with respect to the technical requirements of the Building Regulations (Northern Ireland) 2011 (“the Building Regulations”).

Technical Booklets are intended to provide guidance for some of the more common building situations. However, there may be alternative ways of meeting the requirements of the Building Regulations. There is no obligation to follow the methods or comply with the standards set out in this Technical Booklet if you perfer to meet the requirements in some other way.

Other requirements

The guidance contained in this Technical Booklet relates only to the requirements of regulation V2, V3, V4 and V5. The work will also have to comply with all other requirements of the relevant Building Regulations.

Diagrams

The diagrams in this Technical Booklet supplement the text. They do not show all the details of construction and are not intended to illustrate compliance with any other requirement of the Building Regulations. They are not necessarily to scale and should not be used as working details.

~~References~~

~~Any reference in this Technical Booklet to a publication shall, unless otherwise stated, be construed as a reference to the edition quoted, together with any amendments, supplements or addenda thereto current at 22 November 2000.~~

British Standards and European Technical Specifications

The Building Regulations are made for the following specific purposes, securing the health, safety, welfare and convenience of people, furthering the conservation of fuel and power, furthering the protection and enhancement of the environment and promoting sustainable development. Standards and technical approvals are relevant guidance to the extent that they relate to these purposes. However, they may also address other aspects of performance such as serviceability, or aspects which although they relate to health and safety are not covered by the Building Regulations.

In this introduction and throughout this Technical Booklet any reference to a British Standard shall be construed as a reference to–

(a) a British Standard or British Standard Code of Practice;

(b) a harmonised standard or other relevant standard of a national standards body of any Member State of the European Economic Area;

(c) an international standard recognised for use in any Member State of the European Economic Area;

(d) any appropriate, traditional procedure of manufacture of a Member State of the European Economic Area which has a technical description sufficiently detailed to permit an assessment of the goods or materials for the use specified; or

(e) a European Technical Approval issued in accordance with the Construction Products Directive,

provided that the proposed standard, code of practice, specification, technical description or European Technical Approval provides, in use, equivalent levels of safety, suitability and fitness for purpose as that provided by the British Standard.

The Department intends from time to time to review the guidance in its Technical Booklets to reflect emerging European harmonised standards. Where a national standard is to be replaced by a European harmonised standard, there will be a co-existence period during which either standard may be referred to. At the end of the co-existence period the national standard will be withdrawn.

Products conforming with a European Council Directive

Any product designed and manufactured to comply with the requirements of a European Council Directive does not have to comply with any other standard or part of a standard, whether British, International or other, which relates to the same characteristic or specific purpose as the EC Directive.

CE marked construction products

Any construction product (within the meaning of the Construction Products Directive) which bears a CE marking shall be treated as if it satisfied the requirements of any appropriate British Board of Agrément Certificate, British Standard or British Standard Code of Practice relating to such a product, where the CE marking relates to the same characteristic or specific purpose as the Certificate, Standard or Code of Practice.

Named standards

Where this Technical Booklet makes reference to a named standard, the relevant version of the standard is the one listed in the Appendix. However, if this version has been replaced or updated by the issuing standards body, the new version may be used as a source of guidance provided that it continues to address the relevant requirements of the Building Regulations.

Materials and workmanship

Any work to which a requirement of the Building Regulations applies must, in accordance with Part B of the Building Regulations, be carried out with suitable materials and in a workmanlike manner. ~~The requirements of Part B can be complied with by following an appropriate British Standard or it may be demonstrated that the requirements have been complied with by other suitable means, such as an acceptable British Board of Agrément Certificate, Quality Assurance Scheme, Independent Certification Scheme or Accredited Laboratory Test Certificate.~~

You may show that you have complied with the requirements of Part B (Materials and workmanship) by the appropriate use of –

(a) a product bearing CE marking in accordance with the Construction Products Directive (89/106/EEC)[1] as amended by the CE Marking Directive (93/68/EC)[2], the Low Voltage Directive (2006/95/EC)[3] and the EMC Directive (2004/108/EC)[4];

(b) a product complying with an appropriate technical specification (as defined in those Directives mentioned above), a British Standard, or an alternative national technical specification of a Member State of the European Union or Turkey[5], or of another State signatory to the Agreement on the European Economic Area (EEA) that provides an equivalent level of safety and protection, or

(c) a product covered by a national or European certificate issued by a European Technical Approval Issuing body, provided the conditions of use are in accordance with the terms of the certificate.

You will find further guidance in Technical Booklet B (Materials and workmanship.)

Testing of materials and construction

Where for the purposes of this Technical Booklet testing is carried out it shall be carried out by an appropriate organisation offering suitable and satisfactory evidence of technical and professional competence and independence. This condition shall be satisfied where the testing organisation is accredited in a Member State of the European Economic Area in accordance with the relevant parts of the EN 45000 series of standards for the tests carried out.

Independent Certification Schemes

There are many UK product certification schemes. Such schemes certify compliance with the requirements of a recognised document which is appropriate to the purpose for which the product is to be used. Products which are not so certified may still conform to a revelant standard.

1 As implemented by the Construction Products Regulations 1991 (SI 1991 No 1620).

2 As implemented by the Construction Products (Amendment) Regulations 1994 (SI 1994 No 3051).

3 As implemented by the Electrical Equipment (Safety) Regulations 1994 (SI 1994 No 3260).

4 As implemented by the Electromagnetic Compatibiliy Regulations 2006 (SI 2006 No 3418).

5 Decision No. 1/95 of the EC-Turkey Association Council of 22 December 1995.

Many certification bodies that approve products under such schemes are accredited by the United Kingdom Accreditation Service (UKAS). Such bodies can issue certificates only for the categories of product covered under the terms of their accreditation

Interaction with other legislation

The provisions of this Technical Booklet relate to the requirements of the Building Regulations and do not include measures which may be necessary to meet the requirements of other legislation. Such other legislation generally operates when a building is brought into use and extends to cover aspects which are outside the scope of the Building Regulations.

The Workplace (Health, Safety and Welfare) Regulations (Northern Ireland) 1993

The Workplace (Health, Safety and Welfare) Regulations (Northern Ireland) 1993 contain some requirements which affect building design. The main requirements are now covered by the Building Regulations, but for further information see – The Workplace (Health, Safety and Welfare) Regulations (Northern Ireland) 1993 SR 1993 No 37 and the Workplace Health, Safety and Welfare Approved Code of Practice and Guidance (ISBN 0-33711222-3) published by TSO.

The Workplace (Health, Safety and Welfare) Regulations (Northern Ireland) 1993 apply to the common parts of flats and similar buildings if people such as cleaners, wardens and caretakers are employed to work in these common parts. Where the requirements of the Building Regulations that are covered by this Part do not apply to dwellings, the provisions may still be required in the situations described above in order to satisfy the Workplace Regulations.

Part V Regulations

It should be noted that the following regulations are the requirements of Part V of the Building Regulations (Northern Ireland) 2011. All parts of the regulations must be read in conjunction with Part A: Interpretation and general of those regulations.

PART V

Glazing

V1 Application and interpretation

(1) Subject to paragraphs (2) and (3) this Part shall apply to any building or part of a building.

(2) Regulation V3 shall not apply to glazing in a dwelling.

(3) Regulation V5 shall not apply to glazing that is not intended to be cleaned.

(4) In this Part—

GLAZING includes glass, plastic and other transparent or translucent materials.

V2 Impact with glazing

Reasonable provision shall be made to limit the risk of people sustaining cutting and piercing injuries from accidental impact with glazing.

V3 Transparent glazing

Transparent glazing, of which people may otherwise be unaware and with which they are likely to collide while in passage in or about a building, shall incorporate features which make it apparent.

V4 Safe opening and closing of windows, skylights and ventilators

Any window, skylight or ventilator which can be opened by a person shall be so constructed or equipped that it may be opened, closed and adjusted safely.

V5 Safe means of access for cleaning glazing

Reasonable provision shall be made for safe means of access to clean glazing in walls, ceilings and roofs.

Guidance - Performance and introduction to provisions

Impact with glazing

Performance

0.1 It is the Department's view the requirements of regulation V2 will be met by adopting in critical locations, measures to limit the risk of people sustaining cutting and piercing injuries from impact with glazing.

Glazing in critical locations would be considered reasonably safe were its nature such that, if breakage did occur, any particles would be relatively harmless.

The requirement may also be met if the glazing is sufficiently robust to ensure that the risk of breakage is low, or if steps are taken to limit the risk of contact with the glazing.

Introduction to provisions in Section 2

0.2 The guidance in Section 2 is given to limit the risk of people sustaining cutting and piercing injuries from impact with glazing.

The most likely locations for impacts leading to injuries are in doors and door side panels and at low level in internal and external walls and partitions.

In doors and door side panels, the risk is at its greatest between floor and shoulder level, near door handles and at push plates (especially when normal building movement causes doors to stick). Hands, wrists and arms are particularly vulnerable. An initial impact between waist and shoulder level may be followed by a fall through the glazing, resulting in additional injury to the face and body.

In walls and partitions away from doors, the risks are predominantly at low level, and at that level children are particularly vulnerable.

Transparent glazing

Performance

0.3 It is the Department's view the requirements of regulation V3 will be met by adopting in critical locations, permanent means of indicating the presence of large uninterrupted areas of transparent glazing.

In such locations, the glazing should be made apparent by permanent manifestation (i.e. marking of the glass itself).

Introduction to provisions in Section 3

0.4 The guidance in Section 3 is to reduce the risk of injury to people through collision with transparent glazing as the existence of glass doors or large uninterrupted areas of transparent glazing represents a significant risk of injury through collision.

The risk is increased where two parts of the building, or the building and its immediate surroundings, are essentially at the same level but separated by transparent glazing and people might reasonably have the impression that they are able to walk from one part to the other without interruption.

Safe opening and closing of windows, skylights and ventilators

Performance

0.5 It is the Department's view the requirements of regulation V4 will be met if windows, skylights and ventilators which open can be operated safely.

Location of a control for the safe opening, closing and adjusting of a window, skylight or ventilator can achieve this.

Introduction to provisions in Section 4

0.6 The guidance in this Section is for the location of a control for the safe opening, closing and adjusting of a window, skylight or ventilator.

Where the control cannot be positioned within safe reach of the floor, a safe means of remote operation such as a mechanical or electrical system should be provided.

Where there is a danger of a person falling through the opening whilst opening, closing or adjusting a window, skylight or ventilator, a suitable opening limiter should be provided.

Safe means of access for cleaning glazing

Performance

0.7 It is the Department's view the requirements of regulation V5 will be met if provision is made for safe means of access for cleaning transparent or translucent glazing.

Introduction to provisions in Section 5

0.8 The guidance in Section 5 is to ensure there is safe means of access for cleaning transparent or translucent glazing whether from inside the building, outside the building or where specialist access equipment is required.

Section 1 General

Definition

1.1 In this Technical Booklet the following definition applies –

Critical locations – between finished floor level and –

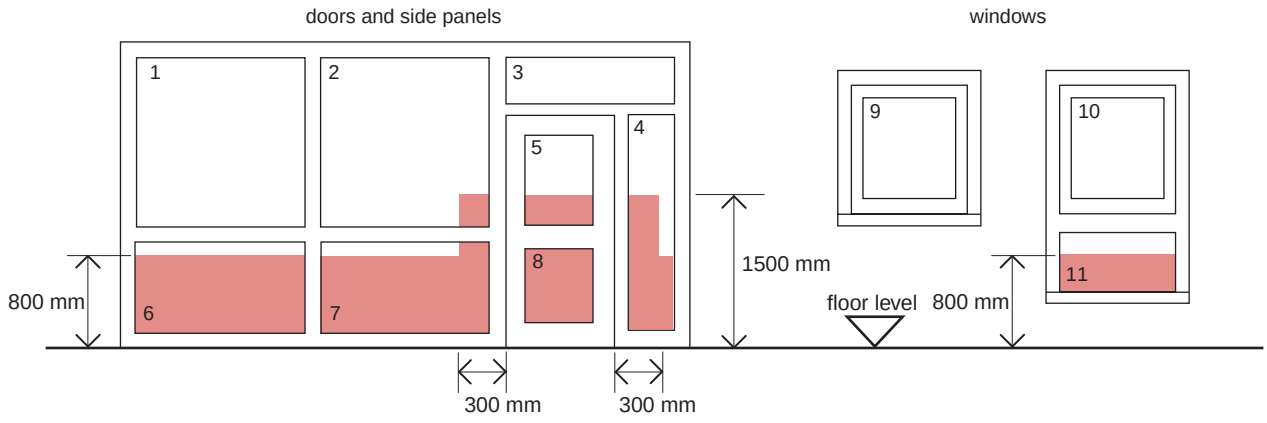
(a) 800 mm above that level in walls and partitions; and

(b) 1500 mm above that level in a door or in a side panel within 300 mm of either edge of a door.

For glazing in critical locations, see Diagram 1.1.

Diagram 1.1 Critical locations in internal and external walls

see para 1.1



shaded areas show critical locations
(ie. glazing in areas 2, 4, 5, 6, 7, 8, 11)

Visual contrast

1.2 Visual contrast is the perception of a difference visually between one element of a building and another by reference to their light reflectance values.

Light reflectance value (LRV) is the total quantity of visible light reflected by a surface at all wavelengths and directions when illuminated by a light source.

For people with adequate vision, differences in the nature or the intensity of colour provide adequate visual contrast. Unfortunately, this is not the case for all people who are visually impaired. The main feature of a surface, which appears to be strongly correlated with the ability of visually impaired people to identify differences in colour, is the LRV. Differences in LRV can be used to assess the degree of visual contrast between the surfaces of elements such as handrails, doors, door furniture, key fittings/fixtures and surrounding surfaces etc..

The LRV scale runs from 0, which is a perfectly absorbing surface that could be assumed to be totally black, up to 100, which is a perfectly reflective surface that could be considered to be perfect white. Because of practical influences in any application, black is always greater than 0 and white never equals 100.

A difference in LRV of 30 points or more allows a degree of variability that is required to provide reasonable visual contrast.

Other information

1.3 Glazing which forms part of guarding required by Part H may need to meet requirements in that Part which are additional to the provisions in this Technical Booklet.

1.4 “Technical Booklet E: Fire safety” includes guidance on fire-resisting glazing and the reaction of glass to fire.

1.5 Compliance with Building Regulation requirement V4 would in accordance with Section 25(3) of the Health and Safety at Work (Northern Ireland) Order 1978, prevent the service of an improvement notice with regard to the requirements for opening, closing or adjusting windows, skylights and ventilators in Regulation 15(1) of the Workplace (Health, Safety and Welfare) (Northern Ireland) Regulations 1993.

1.6 Compliance with Building Regulation requirement V5 would in accordance with Section 25(3) of the Health and Safety at Work (Northern Ireland) Order 1978, prevent the service of an improvement notice with regard to the requirements for cleaning windows and skylights, etc. in Regulation 16 of the Workplace (Health, Safety and Welfare) (Northern Ireland) Regulations 1993.

Section 2 Limiting the risk of impact with glazing

Reducing the risks

2.1 Glazing in critical locations should–

(a) break safely, if it breaks, (see paragraph 2.2);

(b) be robust or in small panes (see paragraphs 2.3, 2.4, and Diagrams 2.1 and 2.2); or

(c) be permanently protected or shielded (see paragraph 2.5 and Diagram 2.3).

Safe breakage

2.2 Safe breakage is defined in BS 6206:1981: Clause 5.3, and also in BS EN 12600 : Clause 4. Both standards are based on an impact test which requires the result of the impact to be limited to creating –

(a) a small clear opening only, with a limit to the size of the detached particles;

(b) disintegration, with small detached particles; or

(c) breakage resulting in separate pieces that are not sharp or pointed.

Glazing suitable for installation in a critical location should satisfy as a minimum the test requirements of Class C of BS 6206 or Class 3 of BS EN 12600. Where it is installed in a door or a door side panel and has a pane width of more than 900 mm, it should satisfy as a minimum the test requirements of Class B of BS 6206 or Class 2 of BS EN 12600.

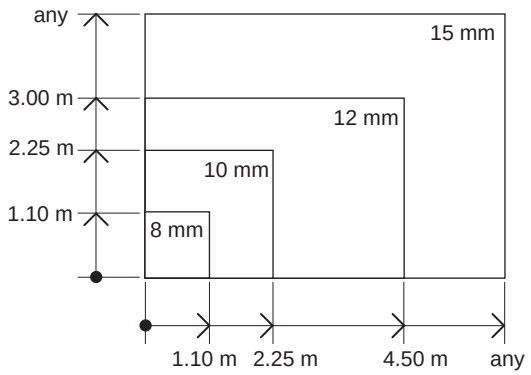
Robustness

2.3 Some glazing materials, such as annealed glass, gain strength through thickness; others such as polycarbonates or glass blocks are inherently strong. Some annealed glass is considered suitable for use in large areas forming fronts to shops, showrooms, offices, factories and public buildings.

To be considered robust, panes of annealed glass should be supported on all sides and should not exceed the sizes in Diagram 2.1 for the given thickness of glass.

Diagram 2.1 Annealed glass thickness/pane size limits

see para **2.3**



the dimensions shown may be height or length.
for 12 mm glass, one dimension will be subject to 3 m manufacturing limit

Glazing in small panes

2.4 A small pane may be an isolated pane or one of a number of panes contained within glazing bars (see Diagram 2.2), traditional leaded lights or copper-lights and should have –

(a) a width of not more than 250 mm; and

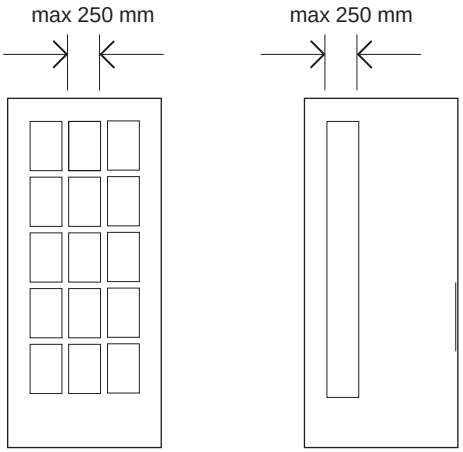
(b) an area of not more than 0.5 m^2,

each measured between glazing beads or similar fixings.

Small panes of annealed glass should be not less than 6 mm in thickness, except in traditional leaded or copper-lights in which 4 mm glass is acceptable.

Diagram 2.2 Dimension and areas of small panes

see para **2.4**



maximum area of single pane should not exceed 0.5 m^2
small panes of annealed glass should be not less than 6 mm in thickness

Permanent screen protection

2.5 When glazing in a critical location is installed behind permanent screen protection the screen should –

(a) prevent a sphere of 75 mm diameter from coming into contact with the glazing;

(b) be capable of withstanding a horizontal force of 0.36 kN at a height of 800 mm above the floor level applied at any point along its length; and

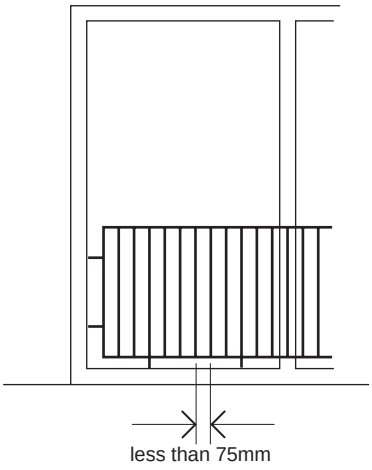
(c) when glazing forms part of guarding required by Part H, be constructed so that a child cannot readily climb up it.

(See Diagram 2.3).

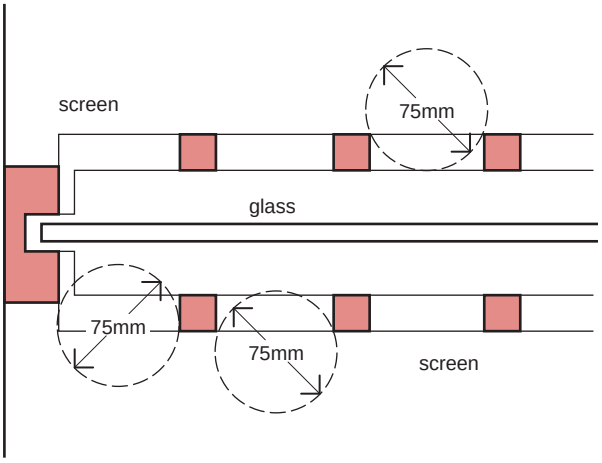
2.6 Glazing in a critical location which is afforded permanent screen protection does not, itself, need to comply with the provisions of paragraphs 2.1(a) and 2.1(b).

Diagram 2.3 Permanent screen protection

see para **2.5**



a climbable screen with horizontal rails is not suitable where guarding is required under Part H



Detail of screen

Section 3 Transparent glazing

Permanent manifestation of glazing

3.1 A door manufactured from transparent glazing, or a large uninterrupted area of transparent glazing where there is a risk of people colliding with it, should be made apparent by permanent manifestation located as shown in Diagram 3.1.

3.2 Where necessary, permanent manifestation should be provided in the form of –

(a) company logos or signs not less than 150 mm high; or

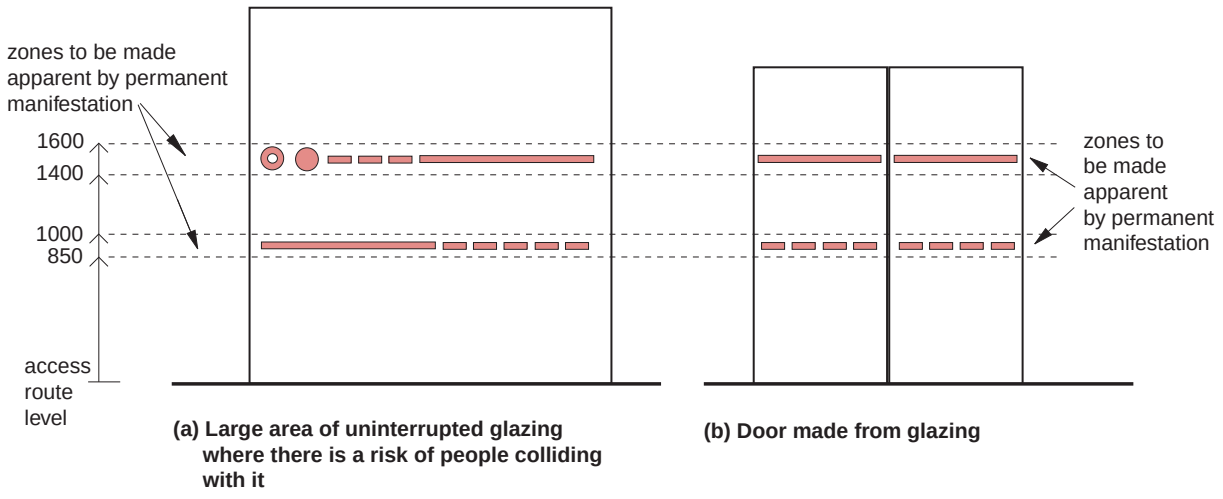
(b) broken or solid lines not less than 50 mm high.

(See Diagram 3.1)

3.3 Permanent manifestation should be distinguishable through suitable visual contrast from the background seen through the glazing.

Diagram 3.1 Examples of manifestation of transparent glazing

see paras **3.1 and 3.2**



(a) Large area of uninterrupted glazing where there is a risk of people colliding with it

(b) Door made from glazing

Section 4 Safe opening and closing of windows, skylights and ventilators

Location of controls

4.1 A control for a window, skylight or ventilator should be within safe reach ~~of~~ for a person standing on a floor (or other permanent stable surface). When considering safe reach, a small recess such as a window reveal may be ignored.

4.2 Where reach is unobstructed the control should be not more than 1.9 m above floor level (see Diagram 4.1(a)).

4.3 Where reach would be obstructed the control should be lower, for example, if the obstruction is a kitchen unit 900 mm high and 600 mm deep, the control should be not more than 1.7 m above floor level (see Diagram 4.1(b)).

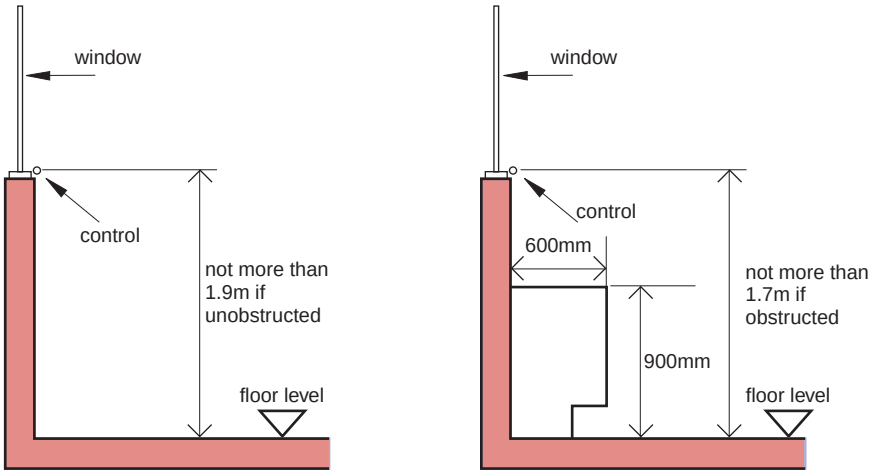
4.4 Where the control cannot be positioned within safe reach of the floor, a safe means of remote operation, such as a mechanical or electrical system should be provided.

4.5 Where there is a danger of a person falling through the opening whilst opening, closing or adjusting a window, skylight or ventilator, a suitable opening limiter should be provided.

4.6 Within a guest bedroom in a building other than a dwelling, a control used for opening and closing a window as required by Part R, will need to meet requirements in that part which are additional to the provisions described above. In such circumstances a control used for opening and closing a window should be provided complying with Technical Booklet R: Section 5.

Diagram 4.1 Height of controls

see paras **4.2** and **4.3**



(a) Unobstructed reach

(b) Example of obstructed reach

Section 5 Safe means of access for cleaning glazing

Access for cleaning glazing

5.1 Where a building has glazing which is designed to be cleaned a safe means of access should be provided –

(a) from inside the building;

(b) from outside the building; or

(c) by specialist access equipment.

Cleaning glazing from inside

5.2 Where the internal face of glazing is designed to be cleaned from the inside of a building the glazing should be either –

(a) accessed safely from a floor; or

(b) accessible from specialist access equipment (see paragraphs 5.6 and 5.7).

5.3 Where the external face of glazing is designed to be cleaned from the inside of a building the glazing should be either –

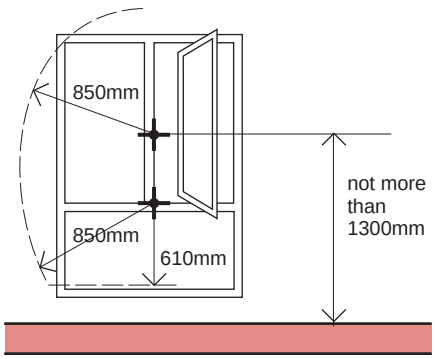
(a) within safe reach of a person standing on a floor (see Diagram 5.1); or

(b) accessible from specialist access equipment.

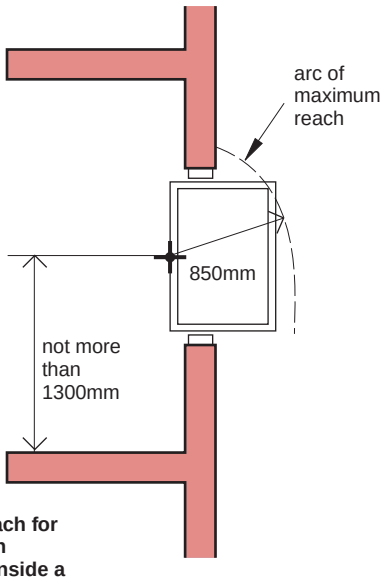
Where there is a risk of falling when cleaning reversible glazing the glazing should be fitted with a mechanism which holds it in the reversed position.

Diagram 5.1 Cleaning the external face of glazing from the inside

see para **5.3**



(a) maximum reach for cleaning glazing from an adjacent opening



(b) maximum reach for cleaning an open casement from inside a building

Cleaning glazing from outside

5.4 Where the external face of glazing is designed to be cleaned from the outside of a building, the glazing should be –

(a) accessed from a safe place having a firm level surface; and

(b) reached from an area adequate in size for the method of cleaning.

Where the height to the window sill is more than 6.0 m and not more than 9.0 m, suitable tying or fixing points for the access equipment should be provided on the building. The standing surface should be a path or similar hard surface (see Diagram 5.2(a)).

Where the height to the window sill is less than 6.0 m and access is by a ladder, the standing surface may be normal soil.

5.5 Where glazing is designed to be cleaned from a walkway the top of the glazing should be not more than 2150 mm above the level of the walkway. The walkway should be not less than 400 mm wide, and either –

(a) the walkway should have guarding not less than 1100 mm high (see Diagram 5.2(b)); or

(b) anchorages for sliding safety harnesses should be provided (see Diagram 5.2(c)).

Specialist access equipment

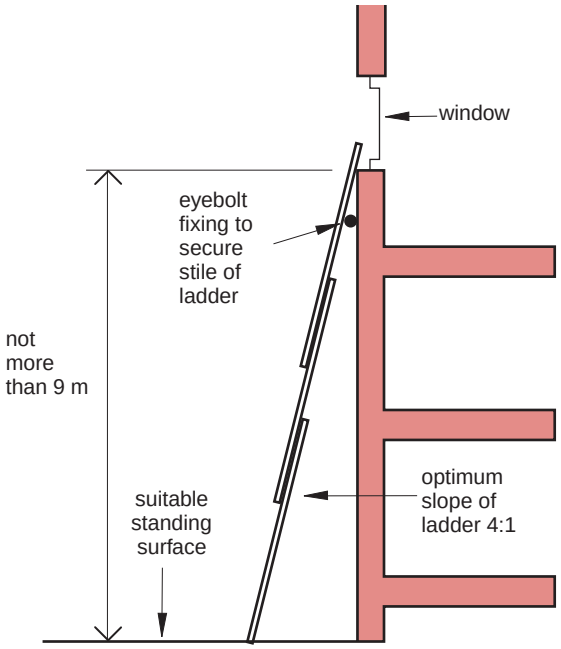
5.6 Where glazing is designed to be cleaned using specialist access equipment such as a boatswain's chair, scaffold tower, suspended cradle, travelling ladder etc., suitable facilities and fixing points should be provided on the building.

5.7 Where a scaffold tower is to be used as the access for cleaning glazing in ceilings and roofs, suitable space for the tower should be provided.

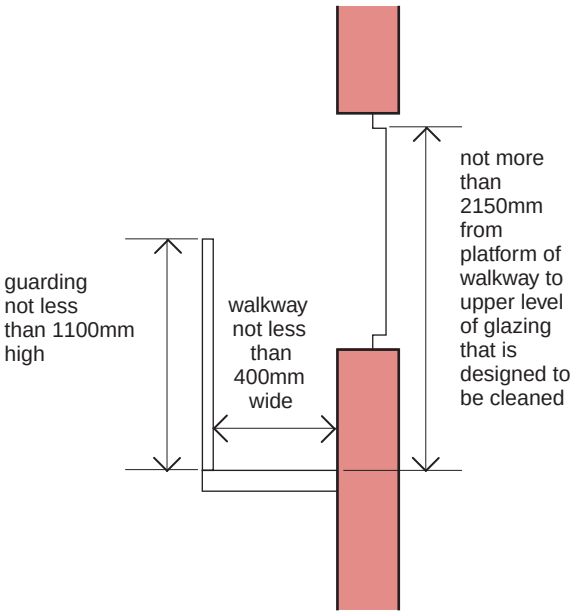
5.8 Further guidance on safe access for cleaning glazing is available in Section 3 (Access for cleaning) of BS 8213 - 1 : 1991 and Section 8 (Design for safety when cleaning) of BS 8213 - 1 : 2004.

Diagram 5.2 Cleaning glazing from the outside

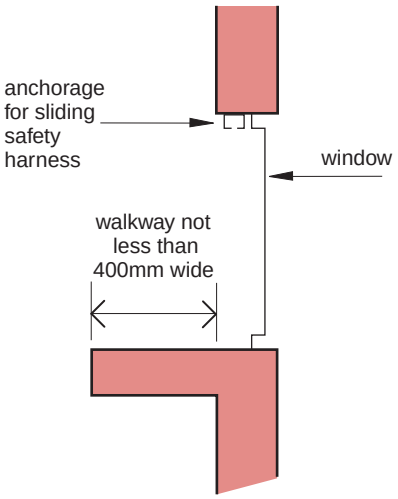
see paras **5.4** and **5.5**



(a) height to window sill more than 6m and not more than 9m above standing surface



(b) walkway with guarding



(c) walkway with anchorage for sliding safety harness

Appendix Publications referred to

BS 6206: 1981	Specification for impact performance requirements for flat safety glass and safety plastics for use in buildings.
	AMD 4580, June 1984
	AMD 5189, August 1986
	AMD 7589, May 1993
	AMD 8156, April 1994
	AMD 8693, July 1995
BS 8213 - 1:1991	Windows doors and rooflights. Code of practice for safety in use and during cleaning of windows and doors (including guidance on cleaning materials and methods).
BS 8213 - 1:2004	Design for safety in use and during cleaning of windows, including door-height windows and roof windows - Code of practice.
BS EN 12600 : 2002	Glass in building. Pendulum test. Impact test method and classification for flat glass.
	AMD xxxx, April 2010
DFP Technical Booklet E 2xxx	
DFP Technical Booklet R 2xxx.	