

APPROVED DOCUMENT K

PROTECTION FROM FALLING, COLLISION & IMPACT



PUBLISHED IN 9 PARTS AND 10 SECTIONS :

The most relevant documents include:-

Requirement K2 Section 3 : Protection from falling

States that guarding is to be provided where it is reasonably necessary for safety to guard the edges of any part of a floor (including the edge below an opening window), balcony or any other place to which people have access.

In the case of dwellings, guarding should be provided that is capable of preventing people from being injured by falling from a height of more than 600mm; i.e. the difference between internal and external levels (which can occur at ground floor locations). For buildings other than dwellings the height is reduced to 380mm.

Guarding can be described as any wall, parapet, balustrade or similar object which can include glazing. In the event that glazing acts as guarding, it must also provide containment in order to resist loads given in BS EN 1991-1-1 with its UK National Annex and PD 6688-1-1.

Guarding in respect of glazing must be provided, as a minimum at the heights shown in Diagram 3.1 (extract) below.

KEY FEATURES

- Unguarded opening lights should be positioned no lower than 800mm from FFL.
- A non-climable barrier, no lower than 800mm, should be provided in the event that opening lights fall within 800mm of FFL.
- Where fixed windows are located within 800mm of FFL, they must provide appropriate containment if no other barrier is present.
- For single family dwellings, external balconies, including Juliette balconies, guarding must be no lower than 1100mm.

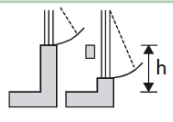
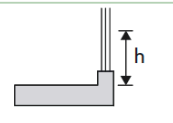
Glazing in all buildings	At opening windows except roof windows in loft extensions, see Approved Document B1	800mm	
	At glazing to changes of levels to provide containment	Below 800mm	

Diagram 3.1 Guarding design

Extract of Diagram 3.1 from current building regulations Part K2

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DESIGN REQUIREMENTS

Where glazing provides protection to personnel from a hazard, such as a fall, Building Regulations dictate that it is acting as a barrier, and as such, design is guided by Regulations and Codes of Practice and should consider the strength of glass, containment and limiting deflection under loading.

The required thickness of glass is typically determined by calculation, and will compare the stress and deflection generated in glass under prescribed loadings, based on circumstance and building occupancy, to allowable limits.

Design requirements are typically governed by applied loads, which are related to the occupancy of a building. The applicable line loads can be determined directly from the UK or Éire National Annex for EN 1991-1-1, with uniformly distributed loads (UDL) and concentrated point loads defined by PD 6688-1-1:2011. The below table is applicable to the UK and Éire, with the values in brackets showing the values from the Irish national Annex where different from the UK.

Category	Sub-Category	Area	Horizontal Uniformly Distributed Line Load (kN/m)	Uniformly Distributed Load (kN/m ²)	Concentrated Point Load (kN)
A	(i)	Single dwelling, including stairs and landings, but excluding external balconies and edges of roofs	0.36 (0.50)	0.50	0.25
	(ii)	Residential areas not covered by (i)	0.74 (0.75)	1.00	0.50
B C1	(iii)	Areas not susceptible to over crowding in office and institutional buildings, reading rooms, and classrooms (including stairs)	0.74 (0.75)	1.00	0.50
	(iv)	Restaurants and Cafes	1.50	1.50	1.50
C2	(v)	Areas with fixed seating within 530 mm of the barrier	1.50	1.50	1.50
C3	(vi)	Stairs, landings, balustrades, corridors and ramps	0.74 (0.75)	1.00	0.50
C4					
D1	(vii)	External balconies and edges of roofs. Footways adjacent to sunken areas	0.74 (0.75)	1.00	0.50
D2	(viii)	All retail areas	1.50	1.50	1.50
C5	(ix)	Footways or paths less than 3 m wide adjacent to sunken areas	1.50	1.50	1.50
	(x)	Theatres, cinemas, discotheques, bars, auditoria, shopping malls, assembly areas and studios. Footways greater than 3 m wide adjacent to sunken areas	3.00	1.50	1.50
	(xi)	Grandstands and stadia	See Requirements of Local Certifying Authority		

COMPLIANCE

When determining the load requirements for a building, local Building Control (or the equivalent certifying authority) should be consulted to ensure that the requirements for the specification will meet the requirements that will be placed upon the building when undergoing final approval.

Full consideration should be given to the requirements of Building Regulations as well as Eurocodes and any associated applicable documents.

CALCULATION

Mechanical strength calculators are available from most of the large glass manufacturers including Pilkington & St Gobain OR calculations can be requested.

The load requirements for the UK above equate to the load requirements defined in BS 6180:2011 within the UK, allowing this standard to be used for guidance when considering the requirements of Eurocodes.

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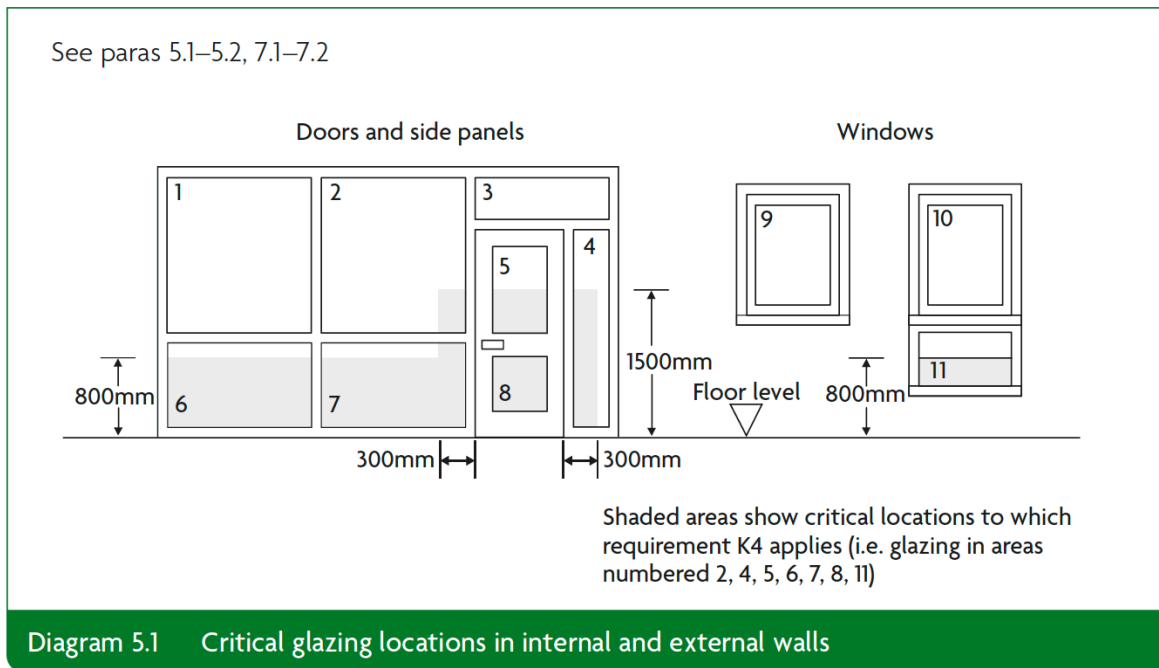
Requirement K4 Section 5 : Protection against impact with glazing

States that for all buildings, glazing with which people are likely to come into contact whilst moving in or about the building shall:

1. If broken on impact, break in a way which is unlikely to cause injury ; or
2. Resist impact without breaking; or
3. Be shielded or protected from impact

The requirements will be met if one of the following approaches is taken for glazing in critical locations which are illustrated in Diagram 5.1

1. Measures to limit the risk of cutting and piercing injuries by the use of glazing that is reasonably safe when broken; for example toughened or laminated glass.
2. Use of glazing that is sufficiently robust to ensure that the risk of breakage is low; for example thicker glass or smaller panes.
3. Steps are taken to limit the risk of contact with the glazing; for example permanent screen protection.



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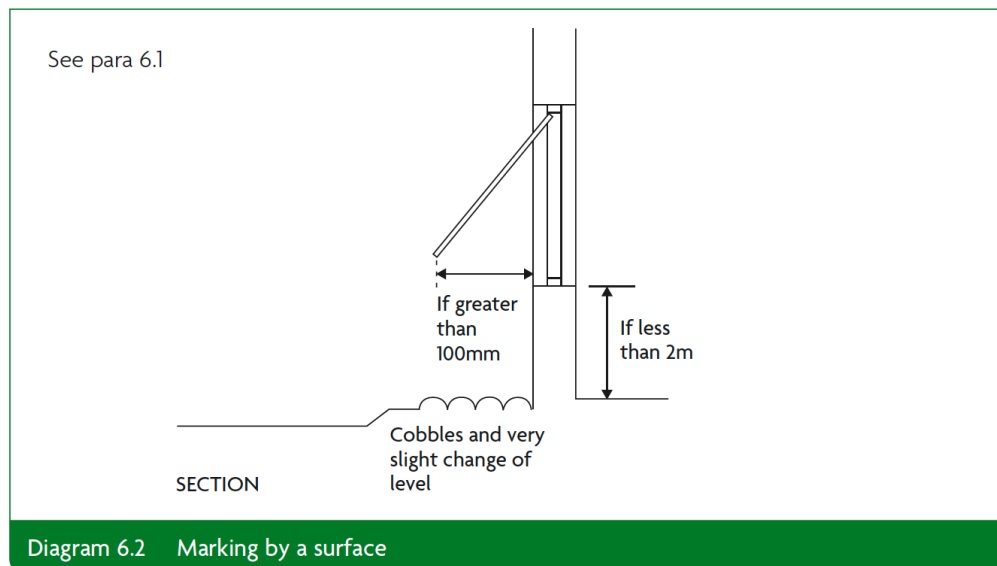
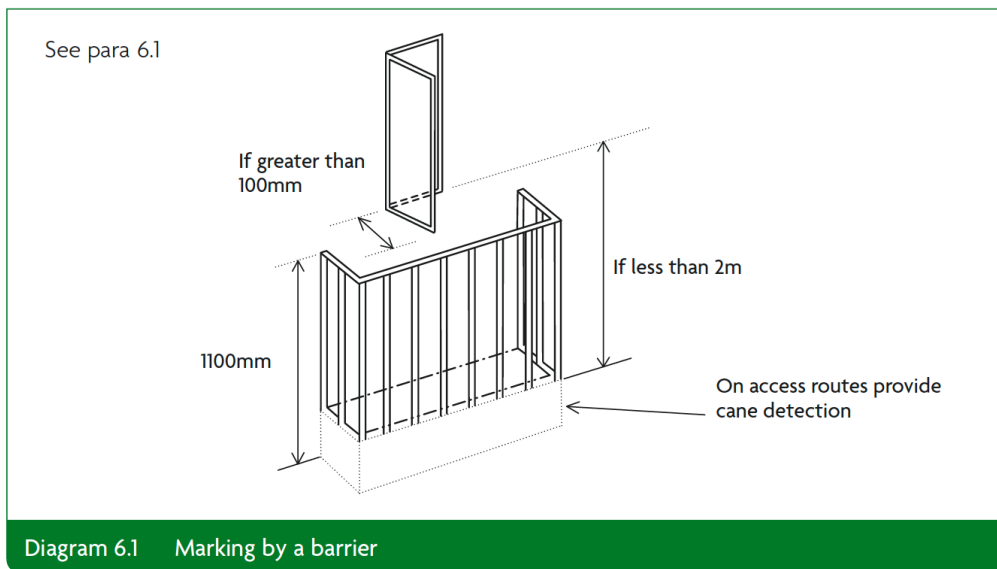
Requirement K5.1 Section 6 : Protection from collision with open windows

States that provision shall be made to prevent people moving in or about the building from colliding with open windows, skylights or ventilators.

Requirement K5.1 **does not** apply to dwellings.

KEY FEATURES

- Windows should be installed in such a way that projecting parts cannot come into contact with people moving in and around the building.
- If windows can be left open by projecting more than 100mm, a barrier should be provided or features should be installed which guide people away from any open window.



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Requirement K5.2 Section 7 : Manifestation of glazing

States that transparent glazing, with which people are likely to come into contact while moving in and about a building, shall incorporate features which make it apparent.

Requirement K5.2 **does not** apply to dwellings.

KEY FEATURES

- Requires a means of indicating the presence of large uninterrupted areas of transparent glazing in critical locations (see K4 Section 5 Diagram 5.1) by the use of:
 - Permanent manifestation or;
 - Alternative indications such as transoms, mullions and door framing.
- Manifestation should contrast visually with the background seen through the glass from both inside and outside in all lighting conditions and should comply with the levels shown in Diagram 7.2.
- Manifestation in the form of a logo or sign should be a minimum 150mm high.
- Manifestation in the form of a decorative feature such as broken lines or continuous bands should be a minimum of 50mm high.
- Where glass doors may be held open, they should be protected with guarding to prevent people colliding with the leading edge.

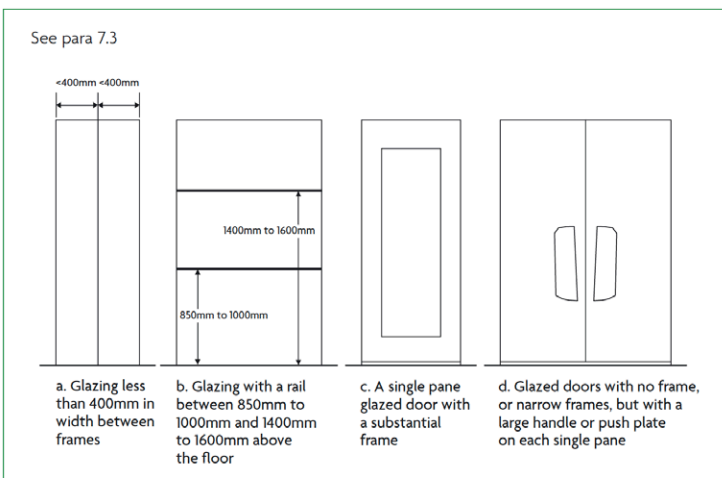


Diagram 7.1 Examples of door-height glazing not warranting manifestation

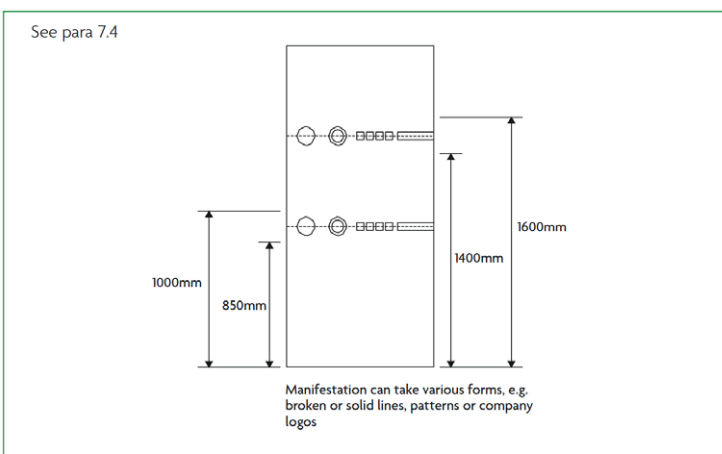


Diagram 7.2 Height of manifestation for glass doors and glazed screens

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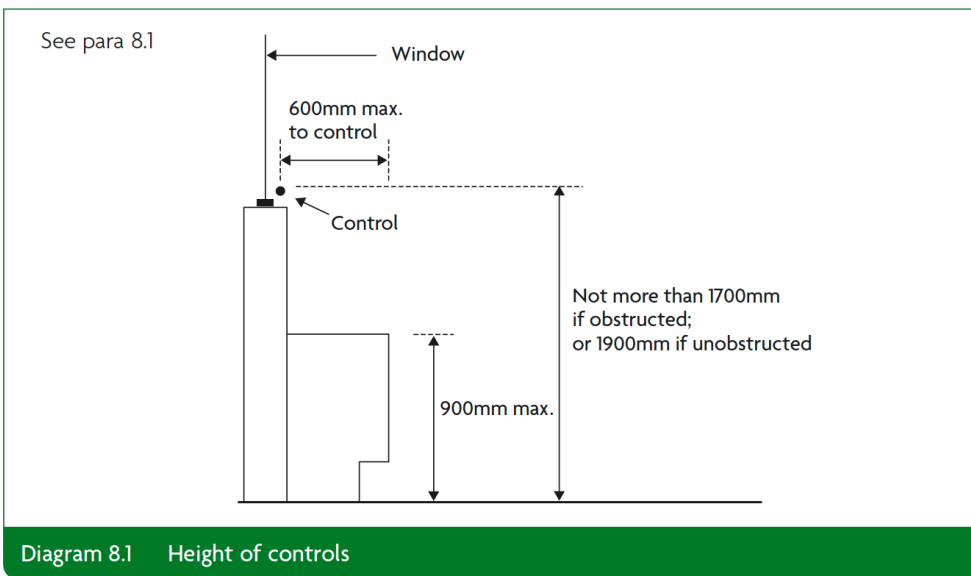
Requirement K5.3 Section 8 : Safe opening and closing of windows

States that windows, skylights and ventilators which can be opened by people in or about the building shall be constructed or equipped that they may be opened, closed or adjusted safely.

Requirement K5.3 does **not apply** to dwellings.

KEY FEATURES:

- Requires window controls to be positioned as shown in Diagram 8.1
- If controls cannot be positioned as shown in Diagram 8.1 within safe reach of a permanent stable surface, provision should be made for a safe manual or electrical means of remote operation.
- Where a person may fall through a window above ground floor level, suitable opening limiters should be provided to restrain the window sufficiently to prevent such falls, or guarding.



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Requirement K5.4 Section 9 : Safe access for cleaning windows

States that provision should be made for any windows, skylights or any transparent or translucent walls, ceilings or roofs to be safely accessible for cleaning.

Requirement K5.4 does **not apply** to dwellings.

KEY FEATURES:

- Diagram 9.1 shows typical safe reaches for cleaning windows from the ground, a floor or other stable surface.
- If windows are reversible for cleaning, a mechanism should be fitted to hold the window in the reversed position.
- Also sets out provisions to be made for safe access for equipment such as ladders, cradles, harnesses and scaffold towers.

