

**Guarding to openable windows with low cill heights**

**Purpose**

BCA technical guidance notes are for the benefit of its members and the construction industry, to provide information, promote good practice and encourage consistency of interpretation for the benefit of our clients. They are advisory in nature, and in all cases the responsibility for determining compliance with the Building Regulations remains with the building control body concerned.

This guidance note is based upon information available at the time of issue and may be subject to change. The Approved Documents should be consulted for full details in any particular case.

**Introduction**

This guidance concerns the requirements of Building Regulations with regard to protection from falling in relation to openable windows (including french windows) in external walls to dwellings. This guidance applies where there is a risk of falling from a height of more than 600mm.

For guidance on fixed windows please refer to BCA Guidance Note 01

**Key Issues**

Approved Document K (England) provides recommendations for the minimum height of windows (800mm) above floor level and guarding for windows where they fall below these levels. These principals will apply equally in Wales.

Increasingly, designers are incorporating deeper windows or french windows with low level cills into their dwelling designs. The cills to these windows can provide platforms to aid climbability by children. As such, the recommendations for guarding height to windows may not be appropriate to afford the required protection and to ensure the safety of the occupants and hence achieve compliance with the functional requirements.

According to Childdata, 50% of four year old children can step up 410mm, and 3% can step up 550mm. Any cill height lower than 600mm may therefore be considered readily climbable by children.

According to Childdata, only 5% of four year old children are taller than 1200mm so most would be fairly stable standing on an upstand if a minimum guard height of 700mm were to be maintained. The following guidance is based on these guide dimensions.

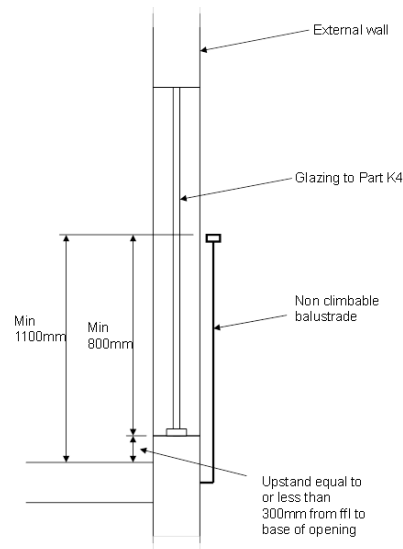
Note: The following diagrams to be read in conjunction with the section titled 'spacing to balusters' – Page 3

**Guidance**

**French windows**

Diagram 1 - When considering guarding to French windows, a minimum guard height of 1100mm measured from finished floor level is required to ensure adequate protection from falling.

Where an upstand is formed (up to 300mm high) to the base of the opening, then an 800mm guard height should be maintained above this level.



**Openable windows in external walls with cill heights between 300mm and 800mm above finished floor level**

Diagram 2 – Indicates acceptable guarding arrangements where cill heights are between 300mm and 600mm above finished floor level. In this case the cill is considered to be readily climbable by children, so a non climbable barrier height of min 700mm needs to be maintained above the cill.

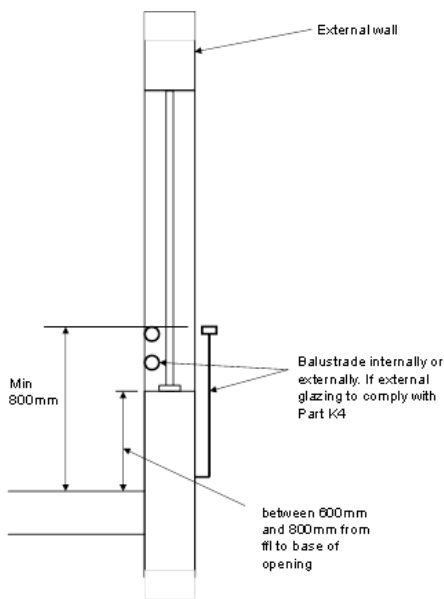
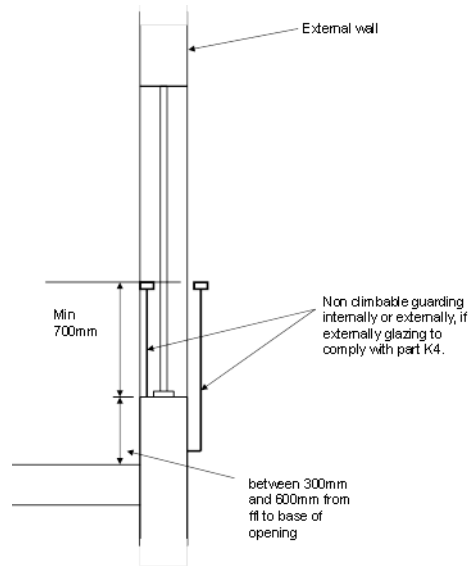
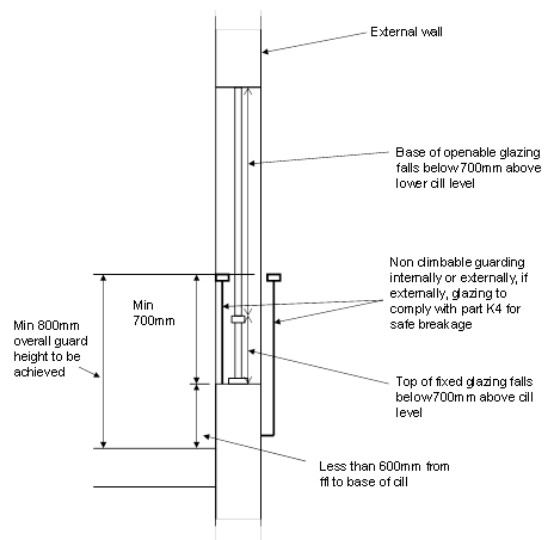


Diagram 3 – Indicates acceptable guarding arrangements where cill heights are between 600mm and 800mm above finished floor level. In this case the cill is not considered to be readily climbable by children, so compliance can be achieved by providing barrier rails to maintain an overall guard height of 800mm above floor level.

**Openable windows in external walls in combination with fixed glazing, cill heights less than 800mm above finished floor level**

An increasingly common arrangement is for a lower fixed glazed pane to be used in conjunction with an openable window above. The fixed glazing may start at or near to floor level. Similar considerations as to the suitable guard height and the climbability of the cill apply.

Diagram 4 – This Indicates an arrangement where fixed glazing is incorporated in the lower part of the window. In this case, as the cill is less than 600mm above ffl it is considered readily climbable by children. As the base of the openable window is below 700mm above the cill, additional guard arrangements are required.



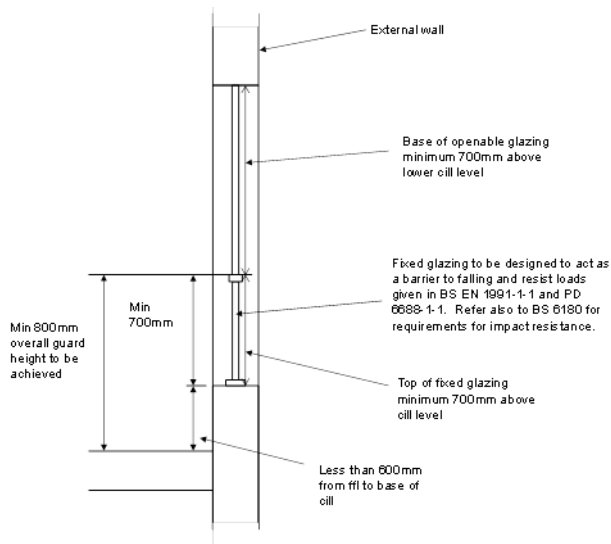
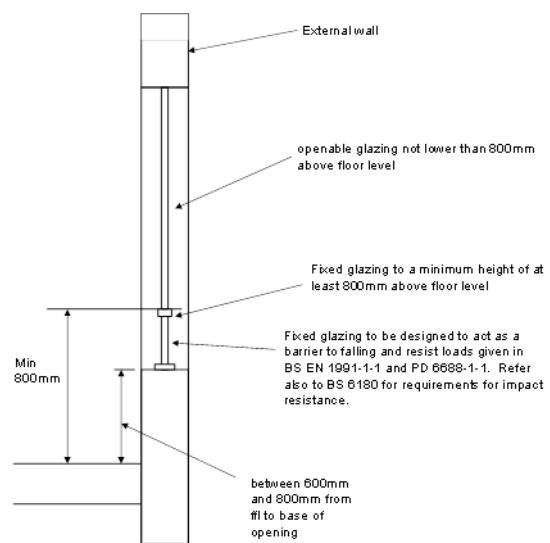


Diagram 5 – In this example, the cill is considered readily climbable by children as it is less than 600mm above ffl, but the fixed glazing has been provided to a minimum height of 700mm above the cill level. Provided the fixed glazing is designed to act as a barrier to falling and also to provide impact resistance, a further balustrade would not be required,

Diagram 6 – As the cill height in this example is a minimum 600mm above floor level, climbability of the cill by children is not a consideration. The lower section of fixed glazing in this case needs to be provided to maintain an overall height of guarding of 800mm above floor level. If the fixed glazing is designed to act as a barrier to falling and also to provide impact resistance, a further balustrade would not be required.



## Spacing of balusters

The above guidance contains options for balustrading to be provided internally or externally to satisfy the guarding requirements for openable windows with low cill heights. Depending on the arrangement, the minimum required spacing of the balusters may vary between needing to prevent the passage of a 75mm or 100mm sphere.

### Balustrade provided externally

Where the balustrading is located externally, the low level glazing is left exposed to the room, as such, it needs in all cases to satisfy Part K4 for protection from impact. This is typically achieved by the use of toughened or laminated glass. The balustrading also needs to be designed to provide protection from falling in accordance with Part K2. This requires the balustrading to be designed to prevent children from being held fast. This can be achieved by spacing the balusters to ensure a 100mm sphere cannot pass through any openings.

### Balustrade provided internally

Where the balustrading is located internally and the low level glazing itself does not comply with Part K4, i.e it is annealed glass rather than toughened or laminated, the internal guarding would need to have balusters spaced so as to prevent a sphere of 75mm from passing through any openings.

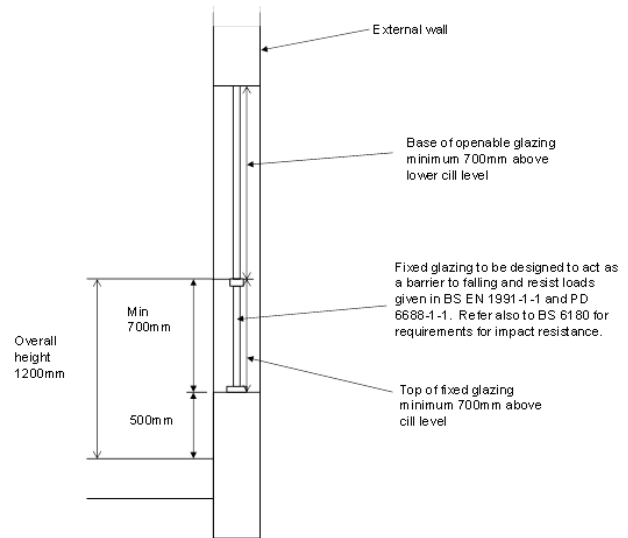
Otherwise, where the glazing itself complies with Part K4, typically by the use of toughened or laminated glass, the balusters would need to be spaced to prevent children from being held fast. As for external balustrading, this can be achieved by spacing the balusters to ensure a 100mm sphere cannot pass through any openings.

**Conflicts between barrier height and means of escape**

Whilst Building Regulations contain a minimum height for guarding to openable windows for the purposes of protection from falling, there is also a maximum height to satisfy means of escape. The base of window openings in this case needs to be no more than 1100mm above floor level to satisfy the requirements for escape windows.

With careful advanced planning and design, using the design principles above, it should be possible to design window openings that are capable of satisfying both these criteria. However in certain situations, or when the above guidance is applied retrospectively to windows with low cill heights that have been installed without the necessary forethought, conflicts may arise. This conflict is most likely to occur where the cill height is between 400mm and 600mm above floor level as the requirement to maintain a 700mm barrier height above this level will then cause the overall height of guarding to exceed 1100mm.

Diagram 7 is an example for a cill height of 500mm with a lower pane of fixed glazing 700mm high giving an overall barrier height of 1200mm from ffl which is above the maximum 1100mm permitted for an escape window.

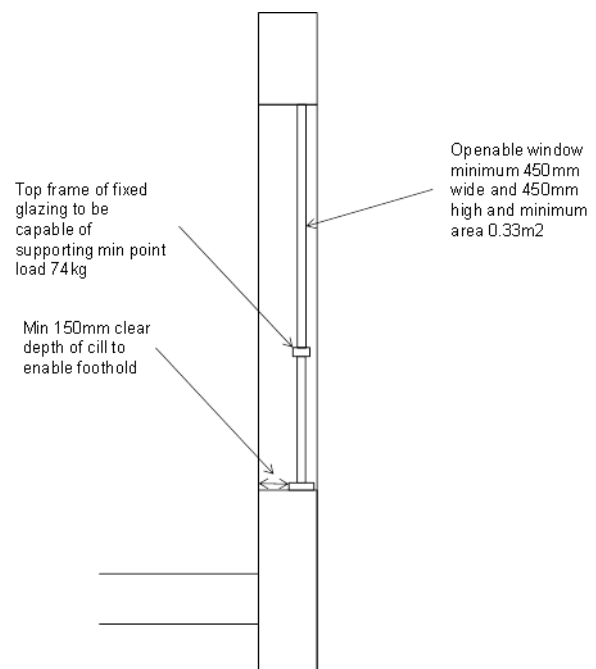


The alternative solutions to satisfy the means of escape requirements for this situation are:

- a) Ensure there is another window in the same room that is suitable for escape
- b) Ensure there is a bypass door to an adjacent room that contains a window suitable for escape
- c) Provided the room is not an inner room, provide a protected escape route via fire doors and fire resisting partitions enclosing the stair in a dwellinghouse or the entrance hall within a flat.

Where the above are not viable, or as a further alternative, it may be possible that the cill could be considered as a suitable platform to step on to prior to egress through the opening portion of the window.

Diagram 8 indicates the clear space required to enable a foothold. In addition the top of the frame to the fixed glazing should be suitably robust to support the weight of a person sitting on the frame as they egress through the window. The minimum size of the openable window for egress purposes should be



The above is one example of a conflict between the requirements for protection from falling and means of escape, there may also be other scenarios where a conflict may arise, particularly where advanced planning to cater for conflicting criteria is not undertaken. The retrospective fitting of a balustrade externally to an outward opening window for instance would prevent the opening of the window for means of escape, so alternative arrangements would be needed to satisfy the means of escape requirements. Also if the window was obstructed from opening, consideration would also need to be given as to how purge ventilation could be provided to the affected room.

### Window restrictors

It is often proposed that window restrictors are fitted to window openings with low cill heights, in order to provide protection from falling.

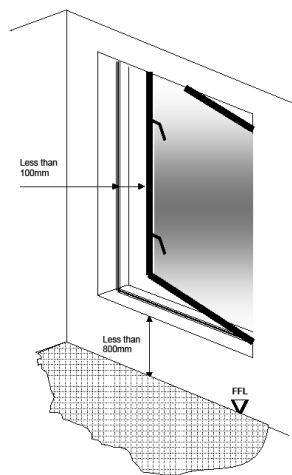


Diagram 4 - Openable Glazing Required To Act As Guarding

However, restrictor devices that are commonly fitted to windows would not be suitable because they can be released (by a key or manually) to allow the window to open more than 100mm. This leaves the potential for a window to be left in the open position and people (including children) would not then be afforded adequate protection from falling required under Part K.

However, “permanent” restrictors (those that cannot be released and would not allow an opening where a 100mm sphere could pass through) may be suitable. This type of restrictor, as well as the frame and glazing used in combination would need to be capable of resisting the loads detailed in BS 6399. However, this may be difficult to demonstrate by structural calculation, and would most likely require a full scale load test of the window arrangement fitted with the proposed permanent restrictor device.

The glazing would need also need to provide adequate impact resistance, typically by the use of toughened or laminated glazing, further guidance can be found in BS6180.

However, even where the use of permanent restrictors can be justified structurally, they may affect the minimum purge ventilation requirement under the guidance in the Approved Document to Part F. That guidance requires a minimum of 1/20<sup>th</sup> floor area of the room served in openable window (height x width of opening part where the window opens 30 degrees or more). Where the window opens between 15 and 30 degrees that area needs to be doubled (i.e. 1/10<sup>th</sup> floor area of room served).

Therefore, it may not be a feasible alternative unless there is another window in the room that is suitably guarded and can provide the necessary ventilation.

A permanent restrictor would also prevent the window used for escape purposes, so for this to be acceptable one of the alternative options a) to c) described above under the section titled ‘Conflicts between barrier height and means of escape’ would need to be provided.