

TECHNICAL MEMORANDUM 010

GENERAL FIRE SAFETY REQUIREMENTS WHERE LOFT CONVERSIONS ARE CARRIED OUT ON BUILDINGS TO FORM A NEW SECOND FLOOR

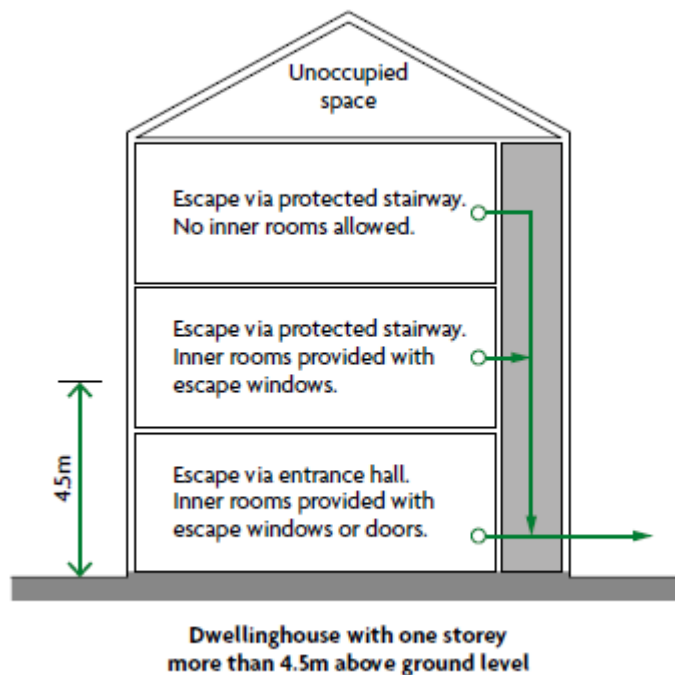
(DWELLING HOUSES consisting of ground, 1st, 2nd floors after conversion and a maximum of two habitable rooms and a floor area not more than 50m² and where only the loft floor is more than 4.5m above ground level.)

Introduction.

The design of modified buildings should result in a layout that safeguards **LIFE SAFETY** for current building occupiers as well as subsequent owner / occupiers of dwelling houses.

The guidance is based on a number of factors all designed to address safe means of escape in case of fire. Some aspects are relevant, whichever solution is adopted, whereas others are dependent on the chosen option.

As always we do recommend that you directly consult the Approved Documents as published by HM Government and with your own design consultants – **Key points are listed at the end of this document.**



General means of escape in case of fire routes for a building with a new second floor

Floors

The new loft floor is, in all solutions, required to achieve 30 minutes fire resistance together with those walls that separate rooms from circulation areas which include the stairwell enclosure. In some situations the existing first floor may be permitted to have a reduced standard of fire resistance - known as a modified 30-minute fire resistance. This reduced

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standard only applies where it separates rooms, floors within circulation areas will still need a full 30 minutes fire resistance as detailed in Building Regulations Approved Document B Volume 1 paragraph 4.7.

Doors

Some homeowners often wish to retain existing doors rather than replace them. In general, doors from rooms and cupboards opening on to the stairwell enclosure must be FD20 standard, but they do not need to be self-closing, any glazing in the doors must have 30 minutes fire resistance. Where a bathroom can only be entered directly from the staircase enclosure any walls, floor or ceiling that separate it from rooms must be constructed to achieve a 30-minute fire-resisting standard.

In some instances, it may not always be necessary to provide fire doors to cupboards entered from the stairwell enclosure if they are small and the fire risk is considered to be low.

However, where a door separates a circulation area from an attached or integral garage it must be to FD30 standard fitted with a self-closing device and incorporate a cold smoke seal with intumescent strip.

Construction details for different door types

(a) **New door openings** - All new doors must be a minimum FD20 fire-rated and fixed in suitable fire resistant frames.

(b) **Existing doors of historical or architectural merit** - In some instances, it may be possible to upgrade these doors to an acceptable fire-resistant standard using intumescent materials, applied as a veneer, thin board material or even as a specialist paint application. This will be dependent on how well the door fits in the frame, its general condition, including; quality of joints and whether they are adequately glued together; and the hinges having a melting point of at least 800c.

Where the door's fire resistance performance cannot be adequately proven, then we will require that mains powered, incorporating battery back-up interlinked, smoke or heat detection is provided within every habitable room including kitchens.

(c) **Existing panel doors in excess of 32mm thickness** - The door should be attached to the door frame with steel hinges, not be visibly warped, fit well into its frame (4mm gap at head and sides maximum) and there should be no visible defects in the panels, no significant defects to adjacent walls or around door frames forming the stair enclosure.

Where the door's fire resistance performance cannot be adequately proven, then we will require that mains powered, incorporating battery back-up interlinked, smoke or heat detection is provided within every habitable room including kitchens.

(d) **Existing panel doors less than 32mm in thickness** The door needs to meet the requirements for panel doors in excess of 32mm and be upgraded. This may be by the application of a suitable fire-resistant proprietary treatment to the panels and stiles on the room side of the door, which must be certified by a specialist supplier confirming its fire-resistance. Alternatively, the door can be upgraded on the room side by infilling the panels with a fire-resistant board (i.e. Supalux) and then applying a similar board that is glued and screwed over the whole of the same side of the door.

Where the door's fire resistance performance cannot be adequately proven, then we will require that mains powered, incorporating battery back-up interlinked, smoke or heat detection is provided within every habitable room including kitchens.

(e) **Existing hardboard flush doors** Existing hardboard or other lightweight flush doors are not considered adequate to provide a reasonable level of fire protection to a stair enclosure and should be replaced with FD20 doors as mentioned in (a) above.

(f) **Glazed doors Existing glazed doors** which do not provide the required fire protection to a stair enclosure should be replaced with FD20 doors in accordance with type (a) above or the glazing should be replaced with suitable fire-resisting glass with appropriate beading.

Fire alarm and detection systems

All smoke and heat alarm and detection systems must comply with Building Regulations Approved Document B Volume 1 - Section 1, which cover positioning, power supplies and design of installations. It is envisaged any system with mains-wired, interlinked alarms will conform to BS 5446 - 1 or BS 5446-2 and be located at all three storey levels of the building within the circulation areas. All alarms should benefit from a standby power supply as detailed in clause 15 of BS 5839-6 with optical smoke detectors in circulation areas and ionisation detectors in living and dining rooms. Optical sensors are generally considered to be more appropriate in bedrooms although ionisation heads are also acceptable.

Design solutions

This guidance considers four possible solutions that can meet the requirements of Building Regulations Approved Document B Volume 1 Part B1 'Means of warning and escape'.

For the purposes of this guide a **protected stairway** is a stair that discharges through a final exit to a place of safety that is adequately enclosed with fire resistant construction.

For a full definition please refer to Building Regulations Approved Document B Volume 1 Appendix A. The following are the four possible solutions.

- Protected single stair escape
- Partially protected single staircase and open plan ground floor (typically utilizing residential water mist or sprinklers, or fire curtains)
- Alternative escape
- Fire-engineered approach (typically utilizing residential water mist or sprinklers, or fire curtains)

Protected single stair

A protected stairway should be provided throughout the height of the building to a final exit. This can be varied by giving access to two separate escape routes at ground level, both of which lead to final exits that are separated from each other. The stair enclosure must be to a 30-minute fire-resistant standard with doors as detailed above. Interlinked smoke detection should be provided in circulation spaces at all levels. Where it cannot be proved that existing doors of historical or architectural merit achieve the FD20 standard of fire resistance, then smoke detectors will be needed at every storey level (including half landing levels adjacent to habitable rooms) and in all habitable rooms entered from the stair enclosure with a heat detector in the kitchen.

Partially protected (loft and 1st floor level) single stair and open plan ground floor

If the dwelling has an open plan ground floor, fire-resistant partitions must be installed to enclose the escape route, or a fast response sprinkler system installed in the ground floor open plan area designed to BS 9251:2005. To comply as a fast response system, each unit will generally have to be exposed and cover the full open plan area. A fire resisting partition and fire door will be needed to separate the ground floor from the upper storeys and access provided to a suitable escape window at first floor level within the safety zone provided by this door and partition.

All alarms should be mains-powered with standby backup and interlinked so that detection of heat or smoke in one unit operates the alarm in all others. In addition, BS 5839:6 recommends optical smoke detectors in circulation areas with ionisation detectors being preferred for living and dining rooms. Optical sensors are preferred in bedrooms although either type would be considered acceptable.

Alternative escape

When the existing dwelling has only one stair, the top storey should be separated from the lower storeys by fire-resisting construction to give 30 minutes fire resistance. Escape windows should be provided at first floor level.

Dwelling houses with one internal stairway should comply with paragraphs 2.5-2.6 of Approved Document Part B Vol1. Generally it is expected that a protected means of escape route, separating every habitable room and which offers 30 minutes of fire resistance in case of fire is provided leading from the upper floors to a final place of ultimate safety outside the dwelling. On the ground floor the provision of a minimum of two final exits that are separated by use of fire resisting construction should be provided.

The alternative route must be physically separated from the main stair enclosure or where this is not possible have fire-resisting construction between the two stairs. This will ensure that one escape is viable at all times in the event of fire.

The alternative route may be via an external stair, in which case it is important to ensure that any glazed areas and doors which give access to this staircase are sufficiently far enough away to not pose a threat to persons using the stairs.

For further guidance refer to Building Regulation Approved Document B1 (Vol.1) paragraph 2.5 onwards. In all cases

Fire-engineered approach

In certain circumstances it may be possible to provide a comprehensive fire alarm and detection system rather than providing a protected stair (Solution 1 above) or an alternative escape route (Solution 3). It should be

appreciated that 'a comprehensive fire alarm and detection system' is either a Grade A or B system of a type described in BS5839-6 and BS 5839-1 as appropriate (see Option 4 7.3.26/31 CPA Loft Conversion Project Guide 2010). A number of factors must be taken into consideration with regard to choice of system and its design as well as the coverage required (i.e. LD1 /LD2).

These include:

- The probability of fire occurring
- The probability of injury or death of occupants if fire occurs
- The probability of the system operating correctly in the event of fire
- The probability of early detection and warning of occupants in the event of fire
- Any potential weakness in the integrity of stair enclosures and doors onto stairways.

It is considered fundamental to the success of this solution that any openings onto the stairwell from rooms and cupboards should be fitted with doors. Whilst these doors do not need to achieve the full FD20 fire resistance, they must be well fitting in their frames, a maximum of 4mm gap at the head and side is considered acceptable.

Similarly, whilst the physical integrity of the stair enclosure must be maintained, there is no requirement to ensure the full 30-minute fire-resistant standard is achieved.

In all cases where this solution is proposed, it is recommended that **YOU MUST** submit to us a technical report, including associated plans and **specifications from a suitably qualified fire engineer** that supports any scheme submitted under this option.

SUMMARY – key points

Loft conversions

Where a new storey is added through conversion to create a storey above 4.5m, both of the following should apply. The full extent of the escape route should be addressed.

- Fire resisting doors (minimum E 20) and partitions (minimum REI 30) should be provided, including upgrading the existing doors where necessary.

Where the layout is open plan, new partitions should be provided to enclose the escape route (Diagram 2.2 of the Approved Document).

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Where it is undesirable to replace existing doors because of historical or architectural merit, the possibility of retaining, and where necessary upgrading, them should be investigated.

- An alternative approach to that described in paragraph 2.21 of the Approved Document would be to comply with all of the following.
 - a. Provide sprinkler protection to any open-plan areas.
 - b. Provide a fire resisting partition (minimum REI 30) and door (minimum E 20) to separate the ground storey from the upper storeys. The door should allow occupants of the loft room access to a first storey escape windows.
 - c. Separate cooking facilities from the open-plan area with fire resisting construction (minimum REI 30)