Final Regulatory Impact Assessment

Proposed additional guidance - Technical Guidance Document B 2006 (Fire Safety)

Post Public Consultation

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Prepared by the Department of Housing, Planning and Local Government
housing.gov.ie
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Introduction

Apartment and multi-residential unit developments continue to be an increasingly common form of housing in Ireland’s urban areas. Between 2002 and 2016, the number of occupied apartments increased by 85%, nationally. New apartments account for approximately 14% of new dwelling completions per annum. In line with increased construction activity, Q4 2018 saw an increase of 21.5% in new apartment completions on Q4 2017.1

It is critical to ensure that apartment living achieves the highest standard of safety with respect to fire, while being an attractive and desirable housing option for a range of household types and tenures, and that the economic and regulatory conditions are such that apartment developments attract investment, bearing in mind affordability.

The design of apartments is also constantly evolving, with development design teams learning from best practice around the world. In particular, open plan flats are becoming increasingly popular. While appropriate standards of accommodation are set from a long term planning and sustainable development perspective, the current Technical Guidance Document B 2006 – Fire Safety does not provide specific guidance on open plan flat layouts.

Fire consultants/ Local Authorities have, to date, exercised their own professional judgement on what is deemed acceptable to comply with Part B (Fire Safety) of the Building Regulations. However, this has led to inconsistent application both within the industry and across the 31 Local Authorities.

In response to this uncertainty and in an effort to promote consistency, it is proposed to provide additional guidance on open plan flats in Technical Guidance B 2006 – Fire Safety, which will ensure that the delivery of quality and durable housing solutions will meet the needs and expectations of consumers in a manner that is safe, with respect to fire safety, and sustainable.

The overall impact of this additional guidance will clarify the fire safety provisions applicable to open plan flats and provide consistency and certainty to current industry practice. In developing the additional guidance, the fire safety requirements for open plan flats in a number of jurisdictions, including England, Scotland, USA, Australia, Denmark and Hong Kong were analysed.

Section 1: Context

1.1 Policy Context

The Department of the Housing, Planning and Local Government (DHPLG) has published a number of documents development of buildings containing flats in the urban environment generally. They are as follows:

- Fire Safety in Ireland Report of the Fire Safety Task Force 2018\(^2\)
- Sustainable Urban Housing: Design Standards for New Apartments: Guidelines for Planning Authorities 2018\(^3\)
- Urban Development and Building Heights Guidelines for Planning Authorities 2018\(^4\)
- National Planning Framework (NPF)\(^5\)

The Design Standards for New Apartments: Guidelines for Planning Authorities 2018 identifies the need to “Enable a mix of apartment types that better reflects contemporary household formation and housing demand patterns and trends, particularly in urban areas;” and recommends that “there is a need for greater flexibility in order to achieve significantly increased apartment development”.

Fire Safety in Ireland Report of the Fire Safety Task Force 2018 recognises that on activation of the common Fire Detection and Alarm System, flats should be evacuated simultaneously.

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\(^5\) [http://npf.ie/](http://npf.ie/)
1.2 Regulatory Context

The design and construction of buildings in Ireland is regulated under the Building Control Acts 1990 to 2014, in order to ensure the safety of people within the built environment. The Acts set out the statutory framework for the regulation and oversight of building activity based on:

- the minimum requirements for the design and construction of buildings as set out in the Building Regulations;
- detailed Technical Guidance Documents to outline how these requirements can be achieved in practice;
- clear administrative procedures for demonstrating compliance in respect of an individual building or works as set out in Building Control Regulations;
- the responsibility for compliance with the Building Regulations resting, first and foremost, with building owners, developers/builders and designers; and
- the responsibility for enforcing compliance with the building regulations resting with the 31 local building control authorities.

1.2.1 Building Regulations

The Building Regulations set out the legal requirements for the construction of new buildings (including houses), extensions to existing buildings as well as for material alterations and certain material changes of use to existing buildings and are divided in 12 parts (classified as Parts A to M).

Technical Guidance Documents (TGDs) are published to accompany each of the parts and provide guidance indicating how the requirements of that part can be achieved in practice. Where works are carried out in accordance with the relevant technical guidance such works are considered to be, *prima facie*, in compliance with the relevant regulation(s).

Technical Guidance Documents cite, on occasion, other standards, codes of practice and documents, as further guidance to the requirements of the TGD.

1.2.2 Review of Part B – Fire Safety

Part B – Fire Safety sets out the legal requirements in relation to fire safety in respect of new buildings (including dwellings) and in respect of existing buildings undergoing works involving an extension, material alteration or certain material changes of use. The fire safety requirements under Part B represent the national statutory minimum standards applicable to the construction of new buildings, including dwellings.

Where works are carried out in accordance with the national guidance provided in Technical Guidance Document B – Fire Safety, this will, *prima facie*, indicate compliance with the fire safety requirements set out in the Building Regulations.

Use of the published Technical Guidance is one method of demonstrating compliance with building regulations, but the adoption of alternative approaches is allowed provided that the relevant requirements of the Regulations are complied with. (See Section 6.7 of TGD B 2006 also on professional judgement etc.).
Part B/ TGD B – Fire Safety is under review at present. In the interest of clarity, TGD B has been split into two volumes. Volume 1 deals with all buildings other than dwelling houses and Volume 2 deals exclusively with dwelling houses.

In 2017, Building Regulations (Part B Amendment) Regulations 2017 (S.I. No. 57 of 2017) and TGD B Fire Safety – Volume 2 – Dwelling Houses (2017) were published, and came into force on 1 July 2017. Volume 2 applies to dwelling houses only. Important revisions in TGD B Volume 2 include:

- enhanced provision for fire detection and alarm systems in dwelling houses;
- guidance on fire safety in community dwelling houses;
- guidance on timber frame construction, including new provisions in respect of timber frame party walls;
- enhanced provisions in respect of loft conversions; and
- new provisions for galleries in dwelling houses and other general updates.

Work is still ongoing on the development of the legal requirements and guidance associated with the fire safety of buildings other than dwelling houses. The next step in this process will be to issue draft amendments to Part B and a draft TGD B Fire Safety – Volume 1 – Buildings other than Dwelling Houses for public consultation.

Until the full review is complete however, the current requirements and guidance for all buildings other than dwelling houses is set out in Building Regulations (Amendment) Regulations 2006 (S.I. No. 115 of 2006) and the relevant parts of TGD B Fire Safety (2006) respectively.

1.3 Statement of objectives

1.3.1 General objectives:
The proposed additional guidance in TGD B 2006 aims to provide clarity to stakeholders involved in the design and construction of open plan flats. The proposed amendment secures adequate standards of health, safety and welfare for persons in and about buildings in respect to the resistance to the passage of fire, and means of escape without imposing disproportionate bureaucracy and costs.

The key objectives of the proposed amendments are as follows:

a) provide additional guidance in relation to fire safety in open plan flats;
b) improve compliance with the Part B of the Building Regulations;

c) improve the usefulness of the Technical Guidance Document and reduce burden;

d) identify changes in standards and practice; and

e) further the achievement of sustainable development.

1.4 Proposed Amendments

1.4.1 Overview of the Proposed Amendments


Guidance on minimum standards of fire safety in Apartment/ flats are addressed in Technical Guidance Document B 2006 (TGD B 2006). Section 1.1.2 specifies that certain Sections, namely 3 and 5 of ‘BS 5588-1:1990 Fire precautions in the design, construction and use of buildings. Code of practice for residential buildings’ should be used, in conjunction with TGD B 2006, as a means to demonstrating prime facie evidence of compliance with the requirements of the Building Regulations.

BS 5588-1:1990 is a Code of Practice (withdrawn but still cited in TGDB 2006) for fire precautions in residential buildings (published by the British Standards Institution). However, BS 5588-1:1990 does not account for open plan flat design. Nor does it provide for extended common corridor lengths.

Where TGD B 2006 includes a reference to a technical specification the reference is to the latest edition current at the time of the publication of TGD B. However, if that version of the technical specification is subsequently revised or updated by the issuing 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.

TGD B 2006 also states that ‘Many of the codes of practice and other documents referred to in 1.1 make references to statutory provisions which may not be applicable. These documents are quoted solely for the purpose of providing appropriate technical guidance to meet the requirements of the Building Regulations’.

BS 5588-1:1990 was withdrawn and superseded by ‘BS 9991:2011 Fire safety in the design, management and use of residential buildings. Code of practice’. While BS 9991 is an updated Code of Practice when compared to BS 5588-1, it is heavily, and explicitly predicated on a stay-put fire safety strategy. This strategy does not conform to the recommendations of the ‘Fire Safety in Ireland Report of the Fire Safety Task Force 2018’\(^6\), where a simultaneous evacuation policy was adopted.

In 2015, BS 9991 was updated, and includes provision for open-plan flats. In the following years, Building Control Authorities noted an increasing trend in apartment design, towards open plan.

This trend in apartment design both in terms of changes to the internal layout and increase in overall height have resulted in many designers citing the provisions of BS 9991 as an alternative design approach as a means of demonstrating compliance with the second schedule to Building Regulations (as amended), owing to the absence of current guidance.

1.4.1.2. Proposed Amendments

This section of the Regulatory Impact Assessment summarises and explains the nature of the proposed additional guidance to Technical Guidance Document B 2006.

This additional guidance to TGD B 2006 provides:

- **Open Plan Flats**
  - Inclusion of a new Section 1.6 relating to open plan flats
  - Specific measures on the means of escape appropriate in open flats (irrespective of height),
  - Guidance on the fire protection required between bedrooms and the main living area and protection of the kitchen area,
  - Appropriate maximum travel distance within an open plan flat,
  - Provision of sprinkler protection within the open plan flat,
  - Provision for adequate separation of the main kitchen cooking appliances from the escape route, where an open kitchen is proposed.

- **Corridors**
  - Inclusion of a new Section 1.7 relating to extended corridor travel distances,
  - Maintaining tenability conditions for escape, in common escape routes; corridors, lobbies, and escape stairs as well as the ventilation of smoke and toxic gases,
  - Provision of appropriate ventilation systems for corridors.

- **Other changes**
  - Clarification with respect to the provision of refuge spaces generally in the lobby or escape stairs in Purpose Group 1(c) buildings containing flats,
Clarification in respect of the provision of dedicated firefighting lobbies in Purpose Group 1(c) buildings containing flats with a floor over 20 metres.

The introduction of a 20m internal travel distance limit within the flat will allow for a degree of design flexibility and innovation not currently available. This is supported by the new provisions on travel distance limits in common corridors.

The provision for an open, or enclosed kitchen will provide flexibility to designers, while the use of a 3m separation of the main kitchen cooking appliances from escape routes in the open plan area between the inner rooms and the flat entrance door will provide a resilient standard of safety. Open kitchen layouts already feature heavily in current open plan apartment design.

The clarification of the requirement for a refuge space in stairs/lobbies will ensure the safety of persons with disabilities.

The clarification of the requirement for a firefighting lobby for in flat buildings over 20 metres will ensure the safety of persons evacuating the building, in line with national policy, and will provide suitable facilities for firefighters.

The proposed amendment has taken into consideration current design trends, and requirements of Building Control Authorities in granting applications for open plan flats. As such the absence of a transition period proposed in this draft will have little or no impact on buildings containing open plan flats at the planning, or detailed design stage.

The proposed amendment has also been stress-tested against current open-plan flat designs. The stress test compared the main requirements, which may alter the layout of a flat – the 20m travel distance, and the requirement for a 3m separation of the escape route from the main kitchen cooking appliance, where an open kitchen is proposed. In all, 23 individual apartment layouts, across 4 distinct developments were analysed, each of which complied with the proposed requirements. Over 50% would have complied with the proposed requirements, with no modification to internal layouts.

The remainder of the apartments would also be capable of complying with the requirements of TGDB, with some modification to internal layouts.

It is envisaged that the additional guidance (Sections 1.6 and 1.7) will complement the current guidance provided in Technical Guidance Document B 2006, for adequate means of escape from flats – Section 3, and Section 5 of BS 5588-1:1990, and Section 1.4 of Technical Guidance Document B 2006.

The other changes noted in the additional guidance seek to clarify existing requirements in respect of the provision of refuges (Section 1.4.15) and Firefighting Lobbies (Section 5.3) in buildings containing flats. This is due to the fact, that although codes of practice (particularly BS 5588-1, 5588-5, and BS 5588-8) are cited, to provide guidance in addition to the provisions of

7 “Fire Safety in Ireland Report of the Fire Safety Task Force 2018
TGD B 2006, they also contain a small number of provisions that are contrary to the design philosophies of TGD B 2006. In addition, some of these provisions conflict with the recommendations of ‘Fire Safety in Ireland Report of the Fire Safety Task Force 2018’ with respect to evacuation policy and the subsequent design philosophy.
Section 2: Cost Benefit Analysis

2.1 Identification and Description of Options
The Department has considered three options for the purpose of this impact assessment.

Option (a) – Do nothing.

Option (b) – provide additional guidance within the current TGD B 2006, to provide for open plan flat designs and extended corridor travel distances, which includes:

- the provision of sprinkler protection,
- enhanced protection of inner rooms and kitchen areas,
- limiting of travel distance within the open plan flat,
- Enhanced ventilation and protection of common corridors to provide for extended travel distances where sprinklers are provided.

Option (c) – Provide additional guidance within the current TGD B 2006, to provide for the use of certain provisions of BS 9991:2015, to provide for open plan flat designs and extended corridor travel distances.

2.2 Impact Analysis

Option (a)
This will have no positive impact and no benefits are expected. TGD B 2006 will not reflect current advances in international standards or account for current trends in flat design and layout.

Failure to update TGD B 2006 may result in local, regional and national variations in fire safety requirements for open plan flats, with no clear guidance on national requirements leading to increased costs and marinating the current status quo with respect to uncertainty.

Option (b)
The overall impact of this additional guidance will provide fire safety guidance in respect to open plan flats and provide consistency and certainty to industry and local authorities.

This will ensure that flats, which are designed with an open plan layout, are designed to national guidance. The provisions of the proposed amendment will maintain an equivalent level of fire safety to a flat with a protected entrance hall.

Option (c)
This option would allow the current trend of open plan design to continue. However, the provisions of BS 9991:2015 are not being adhered to in the current design and construction. BS 9991:2015 does not provide for open kitchens in flats, where the flat layout exceeds 8 x 4
meters squared. This is smaller than the minimum size of apartment permitted under ‘Design Standards for New Apartments: Guidelines for Planning Authorities, 2018’.

In addition, BS 9991:2015 is based on a ‘stay put policy’, which is a different policy to the evacuation policy adopted in Ireland in the ‘Fire Safety in Ireland Report of the Fire Safety Task Force 2018.’

Furthermore, BS 9991:2015, in its introduction states that it is to be used as a contiguous document, and is a companion document to BS 9999:2017.

Finally, the use of the provisions of BS 9991:2015, in relation to open plan flat design, may be insufficient to satisfy the requirements of Part B of the Building Regulations.

2.3 Costs

**Option (a)** – The additional costs associated with this option would be substantial. As there is no national guidance relating to open plan flats, developers, designers, and regulators are forced to:

(i) utilise the ‘best practice’ guidance, perhaps in an ad-hoc manner, or

(ii) look at other international guidance as alternative approaches to compliance, to determine the minimum requirements for safety. This will undoubtedly lead to variation in the application of building regulatory requirements, between Authorities, at local, regional, and national level.

As such, this will lead to an increase in the costs of development, as there will be uncertainty at the outset of the design process, potential delays to the approvals process (the Fire Safety Certificate applications) as Building Control Officers assess designs in the absence of national guidance.

**Option (b)** – The additional costs associated with this option are €1,000 above the cost of open plan flat layouts currently being built in Ireland.

While the costs may appear, on a unit by unit basis to be greater than that of a ‘traditional’ flat layout (incorporating a protected entrance hallway), or open plan flat layouts currently being built in Ireland, the costs of construction will ultimately be reduced owing to:

- The provision of clear consistent guidance in relation to open plan flats, to designers, developers, and Local Authority Personnel to allow them to understand and apply national requirements,
- The potential to provide a greater number of apartments on sites, owing to the extended corridor provisions,
- Reduction in time of the design phase of construction projects, and the potential reduction in time in the approval process,
- The potential reduction in fatal fires in buildings owing to coherent fire safety requirements.
While these costs cannot be quantified, it is recognised that they will be immeasurably beneficial to all stakeholders.

**Option (c)** – The option to provide additional guidance within TGDB 2006 to provide for the use of the relevant provisions of BS 9991:2015 in relation to open plan flat design will undoubtedly result in substantial additional costs. The inclusion of the provisions themselves would carry their own cost, as shown in the table of costs, but these would need to be supplemented to achieve the required standard of safety, particularly for open kitchen arrangements, which are becoming increasingly common.

The inclusion of provisions of BS 9991 relevant to the design of flats, and buildings containing flats in TGDB 2006 would be inappropriate owing to:

- The fact that BS 9991 states in its introduction that it should be used as a contiguous document,
- Substantial differences in the policies and design philosophies between TGDB 2006 and 9991 – Simultaneous evacuation / Stay Put Policies,
- Lack of clarity and consistency amongst stakeholders,
- Individual decisions made by Building Control Authorities, on design variations, without clear guidance, resulting in national variation on the same issue,
- Many current apartment designs in Ireland do not reflect the specific provisions of BS 9991, requiring designers to justify the open kitchen arrangements by means of additional engineered solutions and computer analysis, and requiring approval of those variations by Local Authorities,
- BS 9991 does not consider provisions relating to disabled refuges, which is contrary to the requirements of the Building Regulations,
- Firefighting shaft designs of BS 9991 may not be compatible with a simultaneous evacuation policy.

### 2.3.1 Methodology and assumptions of cost analysis

In developing any cost comparison for the purposes of this Regulatory Impact Assessment it is necessary to recognise that this new proposal is not a new requirement, rather, new additional guidance to provide for open plan design options.

It is also recognised that some Building Control Authorities have already developed their own local requirements for open plan flats and are applying these as minimum standards.

The costs analysis compared the cost of a ‘traditional’ flat layout (protected entrance hallway), with:

1. an open plan layout conforming to requirements currently being applied, and
2. the proposed additional guidance to TGDB 2006.

The costs were based on a single apartment layout, utilised in a notional 50 unit scheme. The internal configuration of the apartment was varied, and costed individually, having regard to the relevant option. The notional flat layout is a 65m² flat, with 2 no bedrooms.
2.4 Benefits

Option (a) - No benefits are expected.

Option (b) - The main benefits of the proposed additional guidance to TGDB 2006 are:
- ensuring that open plan flats will have an equivalent standard of fire safety as flats that have protected entrance hallways,
- clear, consistent national guidance will be provided in relation to open plan flat design,
- that designers will have greater flexibility in the design of flats,
- that the primary escape route to a place of safety will adequately protected,
- that cost benefits of not having to construct a protected entrance hall with fire doors and door closers,
- savings in design fees due to the new deemed to satisfy provisions provided for in the additional guidance to TGD B.

Option (c) - No benefits are expected as it would allow the uncertainty with respect to open plan flat design to continue.

2.5 Other Impacts

2.5.1 Competition assessment
There are no significant areas where issues of competition, restriction or imbalance have been identified. The Department considers that the proposed additional guidance to TGD B 2006 would have no significant effect on competition in any markets. It is considered that the proposals apply in a proportional and equitable way.

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8 This represents the cost of construction of open plan layouts currently being built in Ireland.
2.5.2 Consultation

A technical review group was established to oversee the process, consisting of staff from the NDFEM and Architecture Building Standards division within the DHPLG.

The development of this additional guidance was carried out in consultation with stakeholders from industry and local authorities.

Following consultation with the various stakeholders and the conclusion of research, an updated Technical Guidance Document – Fire Safety is now being published by the Minister for Housing and Urban Development, for public consultation for a period of two months.

2.5.3 Regulatory burden

As this proposed additional guidance is confined to the internal layout of flats and limited in their application, and will not have a material impact on existing planning applications, a transition period in their implementation is not proposed.

It is generally accepted within the construction industry that regulatory and technical requirements e.g. national and European standards as well as codes of practice evolve over time in the light of technological advancements, new product developments and changes in construction practices.

2.5.4 Enforcement and compliance

Under the Building Control Act 1990, enforcement of the Building Regulations 1997 to 2017 is the responsibility of the 31 local building control authorities who have a broad range of powers under the Act to investigate and, where appropriate, take action in the event that non-compliances are identified in buildings.

The Building Control Regulations 1997 to 2018 set out the system of administrative controls to support compliance with the Building Regulations by requiring, inter alia, the submission of Commencement Notices, Fire Safety Certificates, Disability Access Certificates and the more recent Certificates of Compliance on Completion (introduced under S.I. No. 9 of 2014, which came into effect on 1 March 2014).

Responsibility for compliance with the requirements of the Building Regulations 1997 to 2017 is primarily a matter for the owners, designers and builders of buildings.

2.5.5 Sectors and groups affected

Sectors and groups that would be affected include:

(a) Professional Institutions and their members such as the Royal Institute of the Architects of Ireland; Engineers Ireland; the Association of Consulting Engineers of Ireland; the Chartered Institute of Architectural Technologists; the Institution of Structural Engineers;
the Chartered Institute of Building, the Society of Chartered Surveyors Ireland; the Construction Industry Federation etc.

(b) All those involved with the safety aspects of building design, construction and compliance certification would need to familiarise themselves with the new technical guidance;

(c) Persons procuring new buildings and / or building works.
Section 3. Summary and Recommendations

Option (a) - While this option imposes no additional costs, it does not provide any additional benefits over and above existing requirements.

Option (b) - This is the preferred option as it provides clarity to stakeholders involved in the design and construction of open plan flats. Option (b) will ensure that the delivery of quality and durable housing solutions will meet the needs and expectations of consumers in a manner that is safe, with respect to fire safety, and sustainable.

Option (c) – This option introduces unnecessary complexity and would deliver design solutions which are already being modified through engineered solutions, and would therefore not be practicable.

In conclusion, Option (b) is the recommended option.
Section 4. Public Consultation

A draft of the additional guidance to TGD B was published for public consultation from 23 June 2019 to 23 August 2019. A significant number of submissions were received from individuals (2), fire safety consultants (4), housing providers (12), organisations (15), and local authorities (6).

A Department team, consisting of representatives from the Built Environment Advisory Unit and the National Directorate for Fire and Emergency Management, carefully evaluated all 39 submissions received, which included approximately 400 comments.

The received comments related to a range of issues, including concerns relating to:

- The timeframe for implementation of the new requirements,
- The Excessive separation distance of cooking equipment,
- The Definition of an Open Plan Flat,
- The Provision of refuges,
- The requirement for a 60 minute door to open plan flats,
- The provision of an LD2 Domestic detection system in open plan flats,
- The Enclosure of the kitchen or bedroom in fire resisting construction,
- The Measurement of travel distance in the common corridor,
- The Location of smoke shafts,
- The requirement for a firefighting lobby.

As part of the evaluation process of the submission, the Department team met with fire authorities from Dublin City, Cork City, Limerick City, Waterford City and Galway City. In addition, the department team met with the 4 fire consultants that made submissions, Property Industry Ireland, Construction Industry Federation and the Chief Fire Officer from Dublin Fire Brigade.
Section 5 Post Public Consultation

5.1 Outcome of the Public Consultation Process

Following the review of the comments received during the public consultation period, and following the detailed stakeholder engagement, a number of alterations were made to the draft Technical Guidance Document B, as follows:

   a. **Background.** As part of the consultation process and stakeholder engagement, it was highlighted that some very large and more complex buildings may need additional consideration,
   b. **Solution.** While alternative and additional provisions are facilitated through the structure of Part B and TGD B, in the interests of clarity a new section, 0.1.5 – Tall and Very Tall buildings containing Flats was introduced, specifying that for tall buildings, provisions in addition to those contained within TGD B may be necessary, and for Very Tall buildings, an engineered approach may be necessary.

2. Definition of Open Plan Flats.
   a. **Background.** As part of the consultation process, it was highlighted that the definition of an open plan flat could be subject to misinterpretation
   b. **Solution.** A new, simpler definition was provided in order to clarify the particular layouts that constitute an open plan flat.

3. Common alarms in buildings containing flats.
   a. **Background.** As part of the consultation process, and stakeholder engagement it appeared there was a lack of clarity in respect of the specific provisions in relation to refuges, which could lead to unintended design solutions
   b. **Solution.** Explicit provisions in relation to Fire Detection and Alarm systems in the common areas in buildings containing flats, including heat detectors in individual flats and sounders in close proximity to bedroom doors were added to the draft TGD. The proposed provisions are substantially similar to the recommendations contained within I.S. 3218:2013.

4. Disabled refuges.
   a. **Background.** As part of the consultation process, and stakeholder engagement it appeared there was a lack of clarity in respect of the specific provisions in relation to refuges, which could lead to unintended design solutions
   b. **Solution.** Text was clarified to ensure that where a refuge is located in a lobby, that the lobby has direct access to a stairs, were added.
5. Separation distance of main kitchen cooking equipment.
   a. **Background.** As part of the consultation process, a substantial number of commentators raised concerns over the 3.0m separation distance from the main kitchen cooking equipment to the escape route. Comments received from architects, fire engineers, and representative institutions (Engineers Ireland, Royal Institute of the Architects of Ireland, Construction Industry Federation) supported the reduction of the separation distance, proposals ranged from 1.2m to 2.0m.
   b. **Solution.** The data provided in the submissions was reviewed. Additional analysis and consideration of new evidence and information based on similar issues in Scotland, research and full scale fire tests carried out in Australia, and fire engineering calculations based on BS 7974-6, Application of fire safety engineering principles to the design of buildings - Part 6: Human factors: Life safety strategies - Occupant evacuation, behaviour and condition (Sub-system 6) which is a well-known and accepted approach to fire engineering took place. Furthermore, from a holistic perspective the inclusion of a domestic sprinkler system, with required redundancies, and an enhanced domestic fire detection and alarm system, with detectors in every risk room, it was decided to set the separation distance at 1.8m.

6. Fire resisting construction in open plan flats.
   a. **Background.** As part of the consultation process, a substantial number of submissions raised concerns over the requirement to enclose either the bedroom, or the kitchen in fire resisting construction. Their concerns included the assumption that the existence of a fire resisting enclosure to the bedrooms resulted in a stay-put policy, which differentiated from the Report of The Fire Safety Task Force – Fire Safety in Ireland, 2018
   b. **Solution.** The views of the various stakeholders were considered. Holistically, in recognition of the lack of international examples of fire resisting construction internally in open plan flats, and data from full scale fire tests of open plan flats with inner bedrooms, showing that tenable conditions, for escape, were maintained in the access room, where sprinklers are provided, it was decided to remove the proposal for the partitions to be fire resisting.

7. Ventilation systems for protected corridors / lobbies serving flats.
   a. **Background.** As part of the public consultation process, some submissions expressed concern over the provisions relating to ventilation systems.
   b. **Solution.** Additional clarifying provisions, and a re-wording, and re-structuring of the introductory provisions, for clarity and ease of understanding were included in the final text of the TGD.

8. Domestic sprinkler systems.
   a. **Background.** As part of the public consultation, some commentators expressed concern over the lack of requirement for an isolation valve to each apartment, citing issues relating to maintenance, or damage, resulting in whole floors, or parts of floors of buildings containing flats being isolated from the sprinkler system.
b. **Solution.** Additional requirements, relating to the provision of an isolation valve were included in the final text of the TGD

9. **Firefighting Lobbies.**

a. **Background.** Many commentators expressed concern over the cost of the requirement to provide a dedicated firefighting lobby. Other commentators highlighted a concern over the continued citation to BS 5588-5:1994.

b. **Solution.** Having fully considered the views of the various commentators, and having analysed the issue holistically, with regard to:
   i. requirements in other jurisdictions,
   ii. the safety of firefighters, and
   iii. the safety of occupants escaping the building, while facilitating concurrent firefighting operations,

   it was concluded that the firefighting lobby is an essential component of the holistic fire safety design of buildings over 20m. This view was supported by fire officers.

5.2 Impact of the proposed changes

The impact of the proposed changes to the additional guidance is detailed in the following subsections.

5.2.1 Section 0.1.5.

As with any building of significant height or complexity, as per the provisions of Para. 0.2.1 of TGDB 2006, ‘Rigid compliance with the provisions set out in this document might prove unduly restrictive in the design of some large and complex buildings. A fire safety engineering approach that takes into account the total fire safety package can provide an alternative approach to providing fire safety’. As such, the inclusion of Section 0.1.5 as a clarifying requirement for tall and complex buildings containing flats should have no greater impact than already exists, as the consideration of engineering approaches for such large and complex buildings was already included in TGDB.

5.2.2 Definition of open plan flats.

The clarifying provisions should have no greater impact than those specified as part of the RIA of the draft for public consultation, as the requirements have not changed.

5.2.3 Common Fire Alarm Systems.

The inclusion of the particular provisions in Section 1.4.14.4 with respect to common fire alarm systems in buildings containing flats should have no material impact on the built environment, or cost of provision of such as system as:

- The inclusion of such systems is already practice and norm in the built environment,
- The provision of such a system is specified as a recommendation of I.S. 3218:2013.
5.2.4 Disabled Refuges.

The clarifying provisions should have no greater impact than those specified as part of the RIA of the draft for public consultation, as the fundamental provisions have not changed.

5.2.5 Separation of Kitchen Cooking Equipment.

The provisions relating to the proximity of the kitchen from an escape route included in the final draft, as modified from the draft for public consultation, were derived following robust analysis of the issues at hand. Included in the decision making process was such information as:

- ‘remoteness’ from cooking equipment, in an open plan sprinklered flat has been defined in other jurisdictions as 1.8m. In reviewing international practice, standards, and engineering analysis there were no examples of ‘remoteness’ greater than 1.8m.
- The risks associated with cooking equipment, in a sprinklered open plan flat were shown to be not as high as originally considered. This was proven through full scale fire tests in open plan flats.⁹
- The units are required to be fitted with smoke detectors in all habitable rooms, and all risk areas, thereby providing enhanced early detection and warning.
- The minimum permissible separation distance from a chip pan fire has been shown to be less than 1.8m, by means of engineering calculations to BS 7974-6, Application of fire safety engineering principles to the design of buildings - Part 6: Human factors: Life safety strategies - Occupant evacuation, behaviour and condition (Sub-system 6). The provisions of TGDB are designed to incorporate a factor of safety in open plan design.
- The provisions in relation to sprinkler systems specified in TGDB include robust redundancies in the sprinkler system, as befits a life safety system. These redundancies include: provision of a static storage tank of water for the sprinkler system of no less than 3m³, duty / standby pumps, an alternate power supply for the pumps, an enhanced flow rate, and a minimum duration of operation of 30 minutes.
- The original citation of 3m was specified to ensure consistency in keeping with other provisions of TGDB, i.e. a 3m separation from the kitchen to the stairs, for open plan ground floor layouts in a domestic dwelling. However these designs are generally unsprinklered.
- The 1.8m separation requirement is consistent with the separation requirement for radiated heat from the façade, for external escape routes. While these routes are in the open air, they would generally be unsprinklered units.

The clarifying provisions should have no greater impact than those specified as part of the RIA of the draft for public consultation, as the provisions have been updated.

5.2.6 Fire resisting construction.

The provisions relating to the enclosure of bedrooms or kitchen in non-fire resisting construction included in the final draft, as modified from the draft for public consultation, were derived following robust analysis of the issues at hand. Included in the decision making process was such information as:

⁹ See Appendix A for documents researched.
- The provision has no known comparator amongst any of the examined jurisdictions,
- Data from full scale tests demonstrated that tenability in the bedrooms, where a sprinkler system is installed is maintained for a prolonged period of time,
- The units are required to be fitted with interconnected smoke detectors in all habitable rooms, and all risk areas, which will alert occupants early and facilitate evacuation,
- Sprinklers have a proven performance in controlling and extinguishing fires,
- Travel distances in the units have been kept to a reasonable length.

The removal of the requirement for fire resisting construction, as presented in the draft for public consultation, was based on sound, robust evidence, in keeping with the principles of an evidence based approach to Building Regulation.

5.2.7 Ventilation systems for protected corridors / lobbies serving flats.

The clarifying provisions should have no greater impact than those specified as part of the RIA of the draft for public consultation, as the fundamental provisions have not changed.

5.2.8 Domestic sprinkler systems

The clarifying provisions should have no greater impact than those specified as part of the RIA of the draft for public consultation, as the fundamental provisions have not changed.

5.2.9 Firefighting lobbies

The clarifying provisions should have no greater impact than those specified as part of the RIA of the draft for public consultation, as the fundamental provisions have not changed.

5.3 Revised Cost Analysis

The updated cost analysis, following the public consultation, compared the cost of a protected entrance hallway layout, with:

(i) an open plan layout conforming to requirements currently being applied, and
(ii) the proposed additional guidance to TGDB 2006.

The costs were based on a single apartment layout, utilised in a notional 50 unit scheme. The internal configuration of the apartment was varied, and costed individually, having regard to the relevant option. The notional flat layout is a 65m² flat, with 2 no bedrooms.
5.4 Revised Stress Test

The revised additional guidance was stress-tested against current open-plan flat designs. The stress test compared the main requirements, which may alter the layout of a flat – the 20m travel distance, and the requirement for a 1.8m separation of the escape route from the main kitchen cooking appliance, where an open kitchen is proposed. In all, 24 individual apartment layouts, across 4 distinct developments were analysed, each of which complied with the proposed requirements. Over 70% would have complied with the proposed requirements, with no modification to internal layouts.

Table of Costs

<table>
<thead>
<tr>
<th></th>
<th>Option (a)</th>
<th>Option (c)</th>
<th>Option (b)</th>
<th>Industry Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Option</td>
<td>Layouts as per TGDB 2006</td>
<td>BS 9991: 2015 open plan layouts</td>
<td>TGDB 2006 + additional guidance</td>
<td>Open plan layouts currently being provided in Ireland.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(enclosed kitchen)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TGDB 2006 + additional guidance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Open Kitchen)</td>
<td></td>
</tr>
<tr>
<td>Estimated Cost</td>
<td>Current Guidance</td>
<td>+ €1,100.00</td>
<td>+ €1,200.00</td>
<td>+ €900</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>+ €200</td>
</tr>
</tbody>
</table>

10 This represents the cost of construction of open plan layouts currently being built in Ireland.
<table>
<thead>
<tr>
<th>Apartment Type</th>
<th>Development</th>
<th>Floor Area (m²)</th>
<th>Travel Distance (m)</th>
<th>Open Plan Area (m²)</th>
<th>Permissible Area for Main Cooking Appliance (m²)</th>
<th>Proportional Permissible Area (%)</th>
<th>Kitchen appliance within permissible area</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Development A</td>
<td>80.5</td>
<td>12.4</td>
<td>42.94</td>
<td>27.4</td>
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</tr>
<tr>
<td>B</td>
<td>Development A</td>
<td>64.7</td>
<td>11.15</td>
<td>33.46</td>
<td>21.77</td>
<td>65.06%</td>
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</tr>
<tr>
<td>C</td>
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<td>64.7</td>
<td>12.24</td>
<td>31.67</td>
<td>12.32</td>
<td>38.90%</td>
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</tr>
<tr>
<td>D</td>
<td>Development A</td>
<td>64.7</td>
<td>11.71</td>
<td>31.11</td>
<td>18.89</td>
<td>60.72%</td>
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</tr>
<tr>
<td>E</td>
<td>Development A</td>
<td>89</td>
<td>14.9</td>
<td>45.41</td>
<td>30.32</td>
<td>66.77%</td>
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<tr>
<td>F</td>
<td>Development B</td>
<td>109.68</td>
<td>16.78</td>
<td>49.45</td>
<td>28.91</td>
<td>58.46%</td>
<td>Y</td>
</tr>
<tr>
<td>G</td>
<td>Development B</td>
<td>99.88</td>
<td>16.9</td>
<td>45.02</td>
<td>22.6</td>
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<tr>
<td>H</td>
<td>Development B</td>
<td>84</td>
<td>13.75</td>
<td>39.23</td>
<td>27.66</td>
<td>70.51%</td>
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</tr>
<tr>
<td>J</td>
<td>Development B</td>
<td>68.71</td>
<td>12.69</td>
<td>33.18</td>
<td>19.16</td>
<td>57.75%</td>
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<tr>
<td>K</td>
<td>Development B</td>
<td>82.02</td>
<td>16.47</td>
<td>39.47</td>
<td>26.1</td>
<td>66.13%</td>
<td>Y</td>
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<tr>
<td>L</td>
<td>Development B</td>
<td>100.65</td>
<td>16.11</td>
<td>40.27</td>
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<td>63.97%</td>
<td>N</td>
</tr>
<tr>
<td>M</td>
<td>Development C</td>
<td>46.32</td>
<td>13.31</td>
<td>28.15</td>
<td>17.73</td>
<td>62.98%</td>
<td>Y</td>
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<tr>
<td>N</td>
<td>Development C</td>
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<td>13.56</td>
<td>37.61</td>
<td>24.37</td>
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<tr>
<td>O</td>
<td>Development C</td>
<td>81.73</td>
<td>13.05</td>
<td>40.08</td>
<td>27.66</td>
<td>69.01%</td>
<td>Y</td>
</tr>
<tr>
<td>P</td>
<td>Development C</td>
<td>89.16</td>
<td>15.9</td>
<td>38.1</td>
<td>6.27</td>
<td>16.46%</td>
<td>Y</td>
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<tr>
<td>Q</td>
<td>Development C</td>
<td>54.76</td>
<td>11.17</td>
<td>35.89</td>
<td>27.2</td>
<td>75.79%</td>
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<tr>
<td>R</td>
<td>Development C</td>
<td>77.18</td>
<td>14.15</td>
<td>36.36</td>
<td>10.36</td>
<td>28.49%</td>
<td>N</td>
</tr>
<tr>
<td>S</td>
<td>Development C</td>
<td>110.82</td>
<td>16.94</td>
<td>49.29</td>
<td>19.53</td>
<td>39.62%</td>
<td>N</td>
</tr>
<tr>
<td>T</td>
<td>Development C</td>
<td>109.67</td>
<td>17.47</td>
<td>48.52</td>
<td>13.51</td>
<td>27.84%</td>
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<tr>
<td>U</td>
<td>Development C</td>
<td>76.97</td>
<td>12.42</td>
<td>36.15</td>
<td>12.86</td>
<td>35.57%</td>
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<tr>
<td>V</td>
<td>Development D</td>
<td>109.65</td>
<td>18.16</td>
<td>49.4</td>
<td>35.89</td>
<td>72.65%</td>
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</tr>
<tr>
<td>W</td>
<td>Development D</td>
<td>152.88</td>
<td>15.65</td>
<td>87.26</td>
<td>57.23</td>
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<tr>
<td>X</td>
<td>Development D</td>
<td>90.05</td>
<td>15.93</td>
<td>46.02</td>
<td>29.3</td>
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<td>U</td>
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<tr>
<td>Y</td>
<td>Development D</td>
<td>95.74</td>
<td>20.39</td>
<td>55.17</td>
<td>46.86</td>
<td>84.94%</td>
<td>Y</td>
</tr>
</tbody>
</table>
5.5 Conclusion

The revised additional guidance was drafted having regard to a holistic appraisal of the issues. New evidence based on similar issues in Scotland, full scale fire tests carried out in Australia, and fire engineering calculations based on BS 7974-6, which is a well-known and accepted approach to fire engineering, was critically assessed.

Following that rigorous assessment, which included consultations with key experts in the field, it was decided that the proposed modifications were appropriate.

Within the open plan flat compartment, this decision was based on the overwhelming evidence presented, coupled with the inclusion of a domestic sprinkler system, with required redundancies, and a domestic fire detection and alarm system, with detectors in every risk room. In common areas, the small changes and clarifications incorporated in the additional guidance provided needed additional clarity to the requirements.

5.6 Recommendations

The revised additional guidance is recommended, as it provides clarity to stakeholders involved in the design and construction of open plan flats. The guidance will ensure that the delivery of quality and durable housing solutions will meet the needs and expectations of consumers in a manner that is safe, with respect to fire safety, and sustainable. The guidance has been based on a thorough examination of the issues at hand, with regard to international practice, full scale tests, fire simulations data, and fire engineering calculations, as appropriate. A list of the documents consulted during this process have been included in Appendix A.
Appendix A – Referenced standards


Irish Documents

- *Fire Safety in Flats*. Department of Housing, Planning and Local Government. 1994

International Design Codes

- *Approved Document B, 2019*. Department of Communities and Local Government (United Kingdom). 2019
- *Building Regulations – Denmark*. The Danish Ministry of Economic and Business Affairs. 2010
- *Hong Kong Code of Practice for Fire Safety in Buildings*. The Buildings Department, Hong Kong. 2011
- *National Construction Code (Australia), Volume 1, Amendment 1*. The Australian Codes Board. 2016.
- *Code of Practice for Fire Precautions in Buildings (Singapore)*. Singapore Civil Defence Force. 2018

Means of Escape


Fire – Fighting facilities


Fire Detection and Alarm Systems
B.S. 5839-6: 2019 Fire detection and fire alarm systems for buildings - Part 6: Code of practice for the design, installation, commissioning and maintenance of fire detection and fire alarm systems in domestic premises. British Standards Institution. 2019

Ventilation
- Guidance on Smoke Control to Common Escape Routes in Apartment Buildings (Flats and Maisonettes). Smoke Control Association. 2010

Sprinklers
- BS 7974-6 Application of fire safety engineering principles to the design of buildings Part 6: Human factors: Life safety strategies - Occupant evacuation, behaviour and condition (Sub-system 6). British Standards Institution.

Fire Safety Engineering
- BS 7974-6:2004 The application of fire safety engineering principles to fire safety design of buildings - Part 6: Human factors: Life safety strategies - Occupant evacuation, behaviour and condition (Sub-system 6). British Standards Institution. 2004

Other