

PAS 9980:2022

Fire risk appraisal of external wall construction and cladding of existing blocks of flats – Code of practice



Department for Levelling Up,
Housing & Communities



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Foreword

This PAS was sponsored jointly by DLUHC (previously MHCLG) and the Home Office. Its development was facilitated by BSI Standards Limited and it was published under licence from The British Standards Institution. It came into effect on 31 January 2022.

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- Design Fire Consultants
- Probyn Miers (HKA Global Ltd)
- Tenos

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- Building Research Establishment
- Construction Products Association
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- Institution of Fire Engineers
- Local Authority Building Control
- London Fire Brigade
- Department for Levelling Up, Housing and Communities (previously Ministry of Housing, Communities and Local Government)
- National Fire Chiefs Council
- National Social Housing Fire Safety Group
- Royal Institution of Chartered Surveyors
- Scottish Government
- Society of Façade Engineering

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Relationship with other publications

This PAS supplements the recommendations given in PAS 79-2, although the two documents can be used independently and a knowledge of PAS 79-2 is not a prerequisite for using PAS 9980.

This PAS is not intended to constitute a textbook on construction of external walls and cladding systems, and it is not to be regarded as a substitute for relevant knowledge of fire safety principles in the design of such construction. In carrying out a fire risk appraisal of external wall construction and cladding, there is likely to be a need for reference to other codes of practice and guidance documents, a number of which are listed in the Bibliography.

Information about this document

This PAS is particularly intended for use by competent fire engineers and other competent building professionals tasked with advising on the fire risk of external wall construction of existing blocks of flats. However, it is expected that the key outputs of this appraisal will also be useful to those for whom such appraisals are carried out and those who make decisions based upon the outcome of the appraisal. Typically, this will include:

- advice agencies;
- architects;
- architectural technologists;
- building owners/landlords (and others with legal or functional responsibilities for management of external walls and cladding);
- building surveyors;
- contractors;
- façade engineers;

- fire and rescue authorities;
- fire risk assessors;
- insurers;
- local housing authorities;
- managing agents or facility managers;
- project managers; and
- valuers and mortgage lenders.

This PAS makes extensive reference to Government guidance on the fire safety requirements of various versions of the Building Regulations ([1], [2], [3], [4], [5], [6], [7]) in England and Wales, namely Approved Document B (ADB). In the current version of ADB ([8], [9]), which is split into two volumes, blocks of flats fall within the scope of Volume 1 [8]. However, given that this PAS relates to existing blocks of flats, where there is reference to ADB, it often relates to the guidance in previous versions of ADB. From 2006, ADB was divided into two volumes ([10], [11]); prior to the 2019 edition, blocks of flats fell within the scope of Volume 2 [11], while from 2019, they were transferred to Volume 1 [8]. Prior to 2006, there was only a single volume of ADB ([12], [13], [14]), which therefore addressed blocks of flats within its scope.

Reference to classification to BR 135 [15] based on data from a BS 8414 test as a benchmark in ADB ([8], [9]) in relation to external fire spread (for combustible external wall construction and cladding) appeared in many earlier versions of ADB as a means of satisfying the functional Requirement B4(1) of the Building Regulations 2010 [7]. It is no longer accepted for “relevant buildings” in the current version of ADB ([8], [9]) due to changes to Regulation 7 of the Building Regulations 2010 [7]. Nevertheless, classification to BR 135 [15] remains an applicable benchmark for blocks of flats with a storey over 18 m built prior to 2019.

Technical guidance in the devolved administrations can be found on the relevant Government websites.

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- Figure A.9, Figure A.10 and Figure B.7: BRE Global, Bucknalls Lane, Watford, Herts, WD25 9XX;
- Figure B.3: Scottish Fire and Rescue Service, Westburn Drive, Cambuslang, G72 7NA;
- Figure B.4: London Borough of Hammersmith and Fulham, Town Hall, King Street, Hammersmith, London, W6 9JU;
- Figure B.5: London Fire Brigade, 169 Union Street, London, SE1 0LL;
- Figure B.6: Greater Manchester Fire and Rescue Service, 146 Bolton Road, Swinton, Manchester, M27 8US.

While future revisions of this PAS might include a broader range of residential buildings, the scope of this first version is limited, as described in Clause 1, primarily to multistorey blocks of flats. Nevertheless, the principles of the methodology set out in this PAS can be applied to a broader range of building types, including non-residential buildings, subject to appropriate use of the guidance and cognizance of the differences between such other buildings and multistorey, multi-occupied residential buildings.

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Users may substitute any of the recommendations in this PAS with practices of equivalent or better outcome. Any user claiming compliance with this PAS is expected to be able to justify any course of action that deviates from its recommendations.

It has been assumed in the preparation of this PAS that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

This PAS includes case studies based on commonly found types of external wall construction and its configuration on existing multistorey, multi-occupied residential buildings. However, these are only intended as worked examples for the purpose of illustrating the process followed in an assessment conducted in accordance with this PAS. They are not intended to be relied upon as “off the peg” generic solutions in the particular forms of external wall construction to which they refer.

Presentational conventions

The provisions of this PAS are presented in roman (i.e. upright) type. Its recommendations are expressed in sentences in which the principal auxiliary verb is “should”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

The word “should” is used to express recommendations of this PAS. The word “may” is used in the text to express permissibility, e.g. as an alternative to the primary recommendation of the clause. The word “can” is used to express possibility, e.g. a consequence of an action or an event.

Notes and commentaries are provided throughout the text of this PAS. Notes give references and additional information that are important but do not form part of the recommendations. Commentaries give background information.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

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Particular attention is drawn to the legislation described in the Introduction to this PAS and to guidance available from the Home Office, the Department for Levelling Up, Housing and Communities, and the devolved administrations.

0 Introduction

0.1 Background

The loss of 72 lives in the tragic fire at Grenfell Tower on 14 June 2017 brought the risk of fire spread over external walls into sharp focus. It was not the first time that combustible cladding had been a significant contributory factor in rapid fire spread over the external façades of a high-rise building; indeed, since June 2017, there have been a number of notable fires where this has occurred, both in the UK and overseas. However, the Grenfell Tower fire is exceptional in relation to the combination of rapid fire spread and loss of life. It is now known how this fire (which was unprecedented in the UK) occurred and gave rise to such a tragic outcome; much is being done to make sure that such an event never happens again.

While the combustible cladding panels on the outside of Grenfell Tower were a significant factor in the fire, they were not the only reason for the rapid spread of fire. From the Public Inquiry into the fire [Grenfell Tower Inquiry (www.grenfelltowerinquiry.org.uk)], it has become evident that other elements of the design and construction of the external walls were also contributory, most notably, the presence of combustible insulation, other combustible elements around window openings, and the absence of suitably located and properly installed cavity barriers. It is also relevant that some flat entrance doors were not self-closing.

The initial focus after the Grenfell Tower fire was on the type of cladding panel used, an aluminium composite material (ACM) with an unmodified polyethylene core. Considerable efforts were made to establish where it was present on other buildings and to arrange for its removal and replacement. However, the focus has broadened since then to encompass other combustible cladding materials. Other high-profile fires since the Grenfell Tower fire have prompted this, for example, a fire in student accommodation in Bolton on 15 November 2019, which involved a high pressure laminate (HPL) cladding system, and fires in Manchester (2017) and Barking (2019), which highlighted issues around the use of timber in cladding and on balconies. In addition, there has been a growing realization as to the extent of poor practice in the design and construction of external walls.

In England, the Ministry of Housing, Communities and Local Government (MHCLG) responded to the growing concern regarding external wall construction and fittings on tall residential buildings by issuing a series of Advice Notes, containing guidance on relevant fire safety considerations for those with responsibility for fire safety in these buildings.

Advice Note 11 [16] was aimed at conveying the findings and recommendations of the Government's programme of large-scale fire tests (in accordance with BS 8414) of ACM cladding panels, combined with different forms of insulation. This was the first MHCLG "Consolidated Advice Note", drawing together the information and recommendations set out in earlier Advice Notes.

This was followed by Advice Notes addressing:

- external wall insulation systems with a render or brick slip finish;
- external wall systems with cladding panels other than ACM;
- balconies;
- partial ACM cladding;
- spandrel panels; and
- HPL.

MHCLG (now DLUHC) revised and reissued the Consolidated Advice Note in January 2020 [17]. This version contained the content from all previous Advice Notes, updated and expanded in scope to also address buildings below 18 m in height. A supplementary note relating to this Consolidated Advice Note was issued in November 2020 [18]. Further information on the status of the advice notes can be found on the Government website at <https://www.gov.uk/government/publications/building-safety-advice-for-building-owners-including-fire-doors>.

Common to all of these Advice Notes was the recommendation that building owners seek professional advice on what further steps to take with respect to their external wall system. In particular, this applied when the external wall construction did not conform to the benchmark of classification to BR 135 [15] underpinning the advice. Benchmarks based on classification to BR 135 and others, based on compliance with guidance in Approved Document B (ADB) ([8], [9]) for new buildings, have created problems for owners of existing buildings, as external walls on these buildings cannot necessarily be expected to conform to such benchmarks. Nor can conformity be expected where the guidance has changed. However, there would have been an expectation at the time of build that construction of the external wall system would meet the relevant requirements current at that time.

In the past, the external wall construction of blocks of flats was not routinely included in the fire risk assessments (FRAs) required under the Regulatory Reform (Fire Safety) Order 2005 (the “Fire Safety Order”) [19]. The Fire Safety Act 2021 [20] has now established that external walls fall within the scope of the Fire Safety Order [19]. It follows, therefore, that any FRA of a multistorey, multi-occupied residential building needs to include consideration of the potential for fire spread via the external walls of the building.

However, despite the availability of wide-ranging Government guidance, the assessment of the fire risk associated with external walls has proved problematic. There has been a dearth of publicly available information on the fire performance of materials and systems used on the outside of buildings and there have been very few professionals with the necessary skills and experience. This has led to inconsistent outcomes. In some buildings, significant work to remediate “unsafe” cladding and other aspects of external wall construction has been undertaken to satisfy Government advice. In others, with similar cladding, some fire specialists have considered that no such work is necessary.

The above history is relevant to England. Different legislation and guidance applies in the devolved administrations of the United Kingdom. In Scotland and Northern Ireland, blocks of flats fall outside the legislation that is equivalent to the Fire Safety Order (other than in relation to maintenance of systems and equipment for use by, or the safety of, firefighters).

0.2 Fire risk assessments

It is against the background detailed in 0.1 that the need for specific guidance relating to fire risk appraisal of external wall construction on existing buildings (the “FRAEW”) has arisen.

It is recognized that the FRAEW to which this PAS refers is not necessarily within the competence of the typical fire risk assessor who carries out a typical FRA for a block of flats (e.g. an FRA carried out in accordance with PAS 79-2).

Equally, it is not implied that an FRAEW will be required for all high-rise (or low-rise) blocks of flats. In many cases, it will be manifestly obvious to a competent fire risk assessor that the risk to life from fire spread over external walls is not such as to warrant an FRAEW by a specialist; in these cases, the fire risk assessor will normally address compliance of external wall construction with the Fire Safety Order [19] as part of the FRA.

Examples of this are buildings in which the external wall construction can readily be confirmed as being of traditional masonry construction (i.e. external walls which comprise either two leaves of masonry or a solid masonry leaf), or cases in which it can, otherwise, readily be determined by a typical fire risk assessor (e.g. from the age of the building if it predates the mid-1960s, from an operation and maintenance manual, or an existing report by a competent person, based on a relevant BS 8414 test) that no FRAEW is necessary. However, although the age of a building can be a factor, care is needed in case combustible materials have been added to the external walls over time.

It is, therefore, expected that fire risk assessors will be judicious in their recommendations for an FRAEW by a specialist within the action plan of an FRA. Unnecessary recommendations by fire risk assessors for FRAEWs would make significant demand on the scarce resources available for FRAEWs, thereby diverting attention from buildings in which the public might be at serious risk and that actually do warrant an FRAEW.

For avoidance of doubt, it is not suggested that the fire risk assessor will ignore unusual, but visually obvious, material deficiencies, or design features that place residents or other occupants at undue risk. On the other hand, in determining that the risk to life from fire spread over external walls is not such as to warrant an FRAEW by a specialist, the fire risk assessor is not deemed to be confirming conformity of external wall construction to building regulations (past or present) or the Fire Safety Order [19].

In these circumstances, therefore, deficiencies in construction might well continue to be unrevealed. In the low-risk circumstances described above, experience has shown, over many years and in numerous traditionally constructed buildings, that the risk of loss of life from deficiencies in external wall construction is low. Consultations with the National Fire Chiefs Council (NFCC) at the time of drafting this PAS have confirmed that this is still the case. It is, therefore, not unreasonable in these cases for the fire risk assessor to assume conformity to the building regulations and applicable guidance that were current at the time of construction, unless there is evidence to the contrary.

0.3 Risk-based approach

Where an FRAEW is considered necessary, this PAS is intended to provide recommendations and guidance tailored to the particular risk posed by fire spread over external walls, and to provide tools for a competent person to carry out the FRAEW.

While this PAS includes criteria for determining the level of fire risk to life safety presented by particular types of external wall construction, the methodology outlined is intended only to assist in making comparisons and in assessing the relative risk of different types of materials, components, systems and configurations of external wall construction. Determination of absolute levels of safety is simply not possible at the time of publication of this PAS.

Building design varies considerably and no code of practice such as this PAS can ever provide guidance for all possible circumstances. Accordingly, although this PAS refers to specific materials, systems and configurations used in external wall construction, it cannot address all possible circumstances, and the general principles set out herein need to be applied carefully when considering other types of external wall construction that are not specifically addressed in this PAS.

While it is anticipated that this PAS will be of interest to a broad readership, its use in the fire risk appraisal of external wall construction and cladding requires particular skills, knowledge and experience, such that this is a matter for specialists. While, as noted above, it is not expected that the necessary skills will be possessed by typical fire risk assessors, equally, they will not be possessed by all fire engineers. Users of this PAS who carry out external wall FRAEWs are advised to consider whether they have the necessary competence before applying the recommendations of this PAS to a particular building.

However, the objective of this PAS is broader than simply providing recommendations and a recognized methodology for those who carry out the FRAEW. It is also intended to assist those receiving an FRAEW, and their other advisers, to understand the meaning of the risk rating determined by the methodology contained in this PAS, how the risk rating was derived, where it fits in the context of the building's FRA and the limitations that apply to it.

Although the methodology in this PAS seeks to apply a degree of quantitative, as well as qualitative, judgement, given the state of readily available knowledge and performance data, it follows that any FRAEW will inevitably be, to a large degree, subjective, requiring professional judgement from competent persons. Definitive fire performance of an actual external wall build-up can only be determined by large-scale test. This can lead, and has led, to some difficulties for organizations, their advisers and enforcing authorities, in accepting the outcomes of risk-based approaches.

There has been a distinct move in recent years towards "risk-proportionate" fire safety measures in buildings, rather than the more traditional "prescriptive" approach. However, concern arising from the Grenfell Tower fire has led some stakeholders to seek a more rigid application of the guidance that supports building regulations, without full consideration of risk. Indeed, this has sometimes led to the practice of judging existing buildings against strict compliance with the guidance in the current version of ADB ([8], [9]) and, indeed, the requirements in Regulation 7 of the Building Regulations 2010 (as amended) [7], which is clearly inappropriate as these are concerned with new buildings/building work.

For some stakeholders, there is no appetite to consider a risk-based approach and, for these stakeholders, the only satisfactory outcome is certainty in the performance of external walls in fire, with zero risk to life as the principal objective. The methodology in this PAS cannot be applied when such a view prevails. It is, therefore, assumed that this PAS will only be used in circumstances where a risk-based approach, implemented by competent professionals, is deemed acceptable to relevant interested parties, including those in devolved administrations.

0.4 Objectives of this PAS

The objectives of this PAS are:

- a) to provide competent fire engineers and other competent building professionals with a methodology for appraising and assessing the scope for, and risk from, fire spread via external wall construction and cladding, such that the outcome can be used to inform a building's FRA;
- b) to assist external wall assessors in communicating clearly the results of an FRAEW, such that recipients can understand the process and methodology applied, and to understand the findings;
- c) to assist other professionals in reviewing an FRAEW and in understanding the risk of external fire spread in the context of the building's fire strategy and fire safety arrangements;
- d) to promote better understanding of fire risks associated with external walls and the limitations of what can, and cannot, be achieved in any FRAEW, in contrast with ensuring conformity of new construction to the standards for new buildings;
- e) to enable common relevant terminology to be adopted by those who carry out FRAEWs;
- f) to promote consistency in FRAEWs, and to provide a pragmatic and risk-proportionate approach in an FRAEW;
- g) to establish a satisfactory basis for documentation of FRAEWs;
- h) to enable consistent training in carrying out an FRAEW and thus facilitate more entrants into the profession of carrying out FRAEWs; and
- i) to satisfy professional indemnity (PI) insurers that there is a national standard that underpins consistency in carrying out FRAEWs.

This PAS takes into account the rationale originally set out in the 2020 version of the MHCLG Consolidated Advice Note [17]¹⁾. However, it expands on that advice by providing a tool for appraisal of the likely fire performance of external walls and assessment of the risk associated with external fire spread in the context of the use, occupancy and fire safety arrangements of the building.

The risk-based methodology outlined in this PAS is intended to provide a structured approach to the FRAEW. The outcome of the FRAEW is a determination of whether the external wall construction is acceptable or whether remedial action is necessary to replace some or all of the components of the external wall build-up, or to address shortcomings, such as the absence of cavity barriers.

¹⁾ In Scotland, guidance similar to that provided in the Consolidated Advice Note was published in August 2021 as the Scottish Advice Note [21], and this remains current.

0.5 Structure of this PAS

The PAS is structured so as to address the background to, and thinking behind, FRAEWs, as well as presenting guidance on a methodology to conduct such appraisals. It is consistent with the FRA methodology set out in PAS 79-2.

Each clause contains informative text in italics, giving commentary relating to the recommendations that then follow. Further informative text supporting the commentary and recommendations is contained in annexes. These provide further explanation on the subject or additional guidance.

The scope is set out in Clause 1 of the PAS, and this provides important information on those buildings to which the PAS applies and those it does not. References and terms, definitions and abbreviated terms are given in Clause 2 and Clause 3 respectively.

General issues for consideration before undertaking an FRAEW are set out in Clause 4.

In Clause 5, background information on the nature of fires involving external walls and the mechanisms of fire spread is discussed. This is followed in Clause 6 by discussion of the legislative context for FRAEWs. The principles and scope of FRAEWs are described in Clause 7, in which consideration is given to the benchmark for considering the risk posed by fires involving external walls.

The competence of those carrying out FRAEWs is discussed in Clause 8.

Clause 9 and Clause 10 relate to the information needed to conduct an FRAEW, including from surveys and inspections of the building. In Clause 11, the matter of how materials, systems and configurations of external walls perform in fire is considered, and in Clause 12, considerations relating to fully or partially clad buildings are discussed.

Clause 13 describes a methodology for basic assessments of the suitability of external walls. The circumstances in which a more in-depth assessment might be needed are set out in Clause 14.

Finally, in Clause 15 consideration is given to the content of FRAEW reports.

1 Scope

This PAS gives recommendations and guidance on undertaking a fire risk appraisal of external wall construction and cladding of an existing multistorey, multi-occupied residential building.

NOTE 1 For ease of reading, a fire risk appraisal of external wall construction and cladding is described in this PAS as a fire risk appraisal of external walls (FRAEW).

The purpose of a fire risk appraisal of external walls (FRAEW) is to assess the risk to occupants from a fire spreading over or within the external walls of the building, and to make a decision as to whether, in the specific circumstances of the building, remediation or other mitigating measures to address the risk are considered necessary. It is applicable where the risk is known, or suspected, to arise from the form of construction used for the external wall build-up, such as the presence of combustible materials. The outcome of an FRAEW is intended to inform fire risk assessments (FRAs) of multistorey, multi-occupied residential buildings.

NOTE 2 FRAEWs are particularly applicable to FRAs carried out in accordance with PAS 79-2, but they can be carried out independently of the PAS 79-2 FRA process.

NOTE 3 External walls of existing buildings that comprise only masonry or concrete construction, or in which combustible materials are limited to insulation within the cavity of double skin masonry walls, are usually considered to present an acceptable risk in terms of life safety, and an FRAEW is not considered necessary for these buildings.

NOTE 4 The reference to combustible materials does not include small quantities of combustible material that are likely to be present in most external wall build-ups, e.g. membranes, seals and gaskets, and that represent a negligible or inconsequential fire load.

This PAS also gives recommendations and guidance in relation to the competence of those completing FRAEWs.

This PAS relates to blocks of flats throughout the United Kingdom. It was developed primarily for those in England and, therefore, contains references to the legislation pertinent to buildings in England. However, it can also be applied in the devolved nations of the United Kingdom, subject to care being taken to apply its recommendations within the context of the appropriate regulatory regime and supporting guidance.

NOTE 5 The risk to occupants of new buildings from a fire spreading externally is controlled by building regulations. However, it cannot be assumed that external walls of newly constructed buildings present no risk, unless the external walls contain no, or negligible, combustible material. In England, buildings pre-dating the 2018 amendment to the Building Regulations 2010 [7] are deemed to be existing buildings within the scope of this PAS; in Wales, the equivalent change to the Building Regulations [22] in relation to the combustibility of external walls on relevant buildings was introduced in January 2020.

This PAS applies predominantly to multistorey blocks of flats, but also includes the following types of buildings if, from the perspective of general fire strategy and means of escape design, and specifically evacuation strategy, they are similar in nature to a purpose-built block of flats:

- a) student accommodation;
- b) sheltered and other specialized housing; and
- c) buildings converted into flats.

NOTE 6 Within this PAS, the term “flat” is used to describe a self-contained domestic dwelling within a building. Other terms, such as “apartment”, are commonly used to describe such accommodation. The term “flats” is intended to include those arranged on more than one storey, such as maisonettes or duplex apartments.

NOTE 7 This is also intended to include blocks of flats which are part of a mixed-use building with, for example, shops or offices below.

The approach set out in this PAS is intended to determine the need for any risk-proportionate actions in relation to external wall construction required to protect occupants of blocks of flats, including residents and their visitors, anyone working in the building and people in the immediate vicinity of the building.

This PAS addresses the risk from fire spread over the external walls of multistorey blocks of flats of any height.

It addresses situations in which there is a single wall type or a mixture of different wall types. It also addresses buildings that are partially clad, as well as those that are fully clad, in combustible materials.