

# ● External fire spread – what is the risk and what does it mean for the safety of residents

A guide to PAS 9980:2022 Fire risk appraisal  
of external wall construction and cladding  
of existing blocks of flats

A BSI executive briefing



# Contents

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<b>Introduction</b>	<b>3</b>
Who is the standard for?	4
Background	5
Overview	6
Benefits of using PAS 9980	7
The appraisal process – key clauses	8
Conclusion	10
About the author	10
Why BSI	11

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# Introduction

The Grenfell Tower fire on 14th June 2017 has proved to be a defining moment for the construction industry and the fire safety profession, in particular. The loss of 72 lives, the largest single loss of life in fire since the Second World War, has, quite rightly, led to extensive questioning as to how this occurred in the UK today with what many perceive as a technologically advanced and highly regulated building industry.



The Public Inquiry is ongoing, and the outcome of a root-and-branch review of building regulation and fire safety instigated by Government is yet to take full effect, but

fundamental change is on the way. Already, combustible materials are banned from the external walls for all newly built high-rise blocks of flats in England, Wales and Northern Ireland, and guidance supporting mandatory standards in Scotland also makes stringent requirements in this regard. However, for owners and occupiers of flats in existing blocks, the situation is very different.

While a large number of buildings have been identified as having unsafe cladding, with the need for remediation, in many other cases the situation is less clear cut. Differing, and sometimes highly onerous, requirements have been applied, especially for low-rise blocks, for which the materials and methods of construction used in the external walls were not required to meet any specific fire performance standards when the flats were built. The burden of spiralling costs falling on the leaseholders and owners of these flats has become something of a national crisis. Despite best efforts to resolve issues for mortgage lenders and insurers, the introduction of the EWS1 scheme, appears, to some, to have become part of the problem and not the solution.

It is against this background that PAS 9980:2022, Fire risk appraisal of external wall construction and cladding of existing blocks of flats – Code of practice, was developed. Aimed specifically at the safety of existing blocks of flats, its purpose is to provide a methodology and framework for conducting appraisals of the fire risk posed by combustible external wall construction and cladding. These differ from assessments carried out under the EWS1 scheme, which is to inform valuation and therefore lending decisions, and their focus is risk-based professional judgement. They represent a shift from compliance-based assessments, which have tended to be founded on generic prescriptive requirements.

# Who is the standard for?

PAS 9980 is a code of practice particularly aimed at those undertaking fire risk appraisals of external walls (FRAEWs).

Such external wall assessors are likely to include fire engineers and other building professionals tasked with advising on the fire risk of the external wall construction of existing blocks of flats. Their competence to do so is a key consideration when appointing someone to this task and a major theme of the standard.

However, the standard is also aimed at those for whom such appraisals are carried out and those who make decisions based upon the outcome of the appraisal. These would include:

- building owners/landlords
- building surveyors
- contractors
- façade engineers
- fire and rescue authorities
- fire risk assessors
- insurers
- local housing authorities
- managing agents and facility managers
- project managers



# Background

The initial focus after the Grenfell Tower fire was to determine if metal cladding was present and then if it was an aluminium composite material (ACM), particularly one with a core of unmodified polyethylene. However, that focus has broadened since then to encompass other combustible cladding materials and, in particular, high pressure laminate (HPL).

Issues around the use of timber in cladding and on balconies were also brought within the remit of such investigations. In addition, there has been a growing realization as to the extent of poor practice in the design and construction of external walls.

Up until the outright ban in 2018 on combustible material in external walls of blocks of flats over 18m in height, certification to BR135 using data from a large-scale BS 8414 test was a means of establishing that external walls containing combustible material met the functional requirement on external fire spread within the Building Regulations and could, therefore, be considered safe. This benchmark was contained within guidance supporting the Building Regulations for new buildings. Up until the publication of PAS 9980, Government used this benchmark in its advice to owners and operators of existing blocks of flats on how to assess the risk of fire spread via external walls. This reflected a circumspect approach.

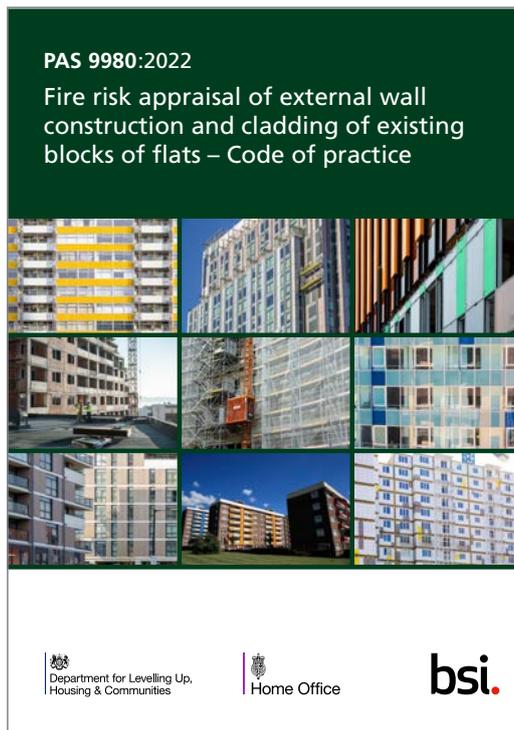
For most existing buildings, no such certification is available, nor can it be readily obtained without expensive large-scale testing of representative external wall build-ups. In such cases, the advice from Government was to seek advice from an appropriately qualified fire engineer. However, fire engineers had no 'tool box' or recognized methodology or framework in order to provide such advice. Hence, the need for PAS 9980.

With the publication of PAS 9980, Government has withdrawn its previous advisory note, with PAS 9980 being seen as providing a more appropriate, risk-based approach to assessing the risk.

PAS 9980 was sponsored by DLUHC and the Home Office. In keeping with the process BSI implements when developing a PAS, a steering group was established which included organizations such as Royal Institution of Chartered Surveyors (RICS), Society of Façade Engineering, Building Research Establishment (BRE), Institution of Fire Engineers, National Fire Chiefs Council, Construction Products Association, Fire Industry Association and London Fire Brigade.

# Overview

Fires involving external walls can be complex and their development difficult to predict. PAS 9980 has brought together a wide range of useful information on the behaviour in fire of a variety of different forms of external wall construction and cladding, along with background information on how fires might start and how they can spread.



PAS 9980 is a code of practice. It, therefore, takes the form of recommendations and guidance, being written in the style of informative text and normative recommendations. That said, it is clearly not a textbook and nor does it purport to contain ‘off the peg’ solutions for the many and varied types of external wall construction and cladding on buildings. The subject area is vast and efforts to distil this into easily applied, stepwise assessments can be overly simplistic and are not without controversy. However, this standard is supported by an extensive series of informative annexes, one of which contains case studies to illustrate the assessment methodology that this standard advocates and the process that should be followed.

At this stage, the standard only relates to multi-occupied, multi-storey residential buildings, principally blocks of flats. However, there is no reason why, at a future date,

the methodology cannot be extended to other building types and different occupancy profiles.

Written around the regulatory framework applicable in England, the standard can equally be used for buildings anywhere in the UK.

FRAEWs complement fire risk assessments (FRAs) of buildings. Duty holders have a legal obligation to carry out FRAs, which are the foundation for managing fire safety in buildings. An FRAEW will inform the building’s FRA but is likely to be quite separate, not least because the level of competence to carry out FRAEWs is not something expected of a typical fire risk assessor.

This, therefore, 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.

Its overall aim is to provide a framework to assess risk and give users a methodology and information in order to make carefully considered professional judgements within the limits of currently available knowledge.

# Benefits of using PAS 9980

PAS 9980 promotes a better understanding of the fire hazards associated with external walls and the limitations of what can, and cannot, be achieved in any assessment of the risk. One of the key benefits of using the standard is consistency of approach.

By using a similar terminology and framework as PAS 79-2, FRAEWs completed to this standard will dovetail with fire risk assessments that are required to meet the Regulatory Reform (Fire Safety) Order 2005 and equivalent legislation in Scotland and Northern Ireland.

The framework seeks to facilitate a structured and holistic appraisal of risk. This will give fire engineers and others freedom to apply risk-based thinking and be pragmatic. It will also provide those receiving FRAEWs with confidence to accept a risk-based approach.

By setting out a rationale to categorise the risk, the ultimate outcome is a risk rating from which decisions can be taken and recommendations made. A key benefit of this approach is that it provides a means to filter out the trivial and maintain perspective on small and incidental amounts of combustibile material in external walls that present little scope for fire development and spread.



# The appraisal process – key clauses

**Clause 7 of the standard sets out the principles behind the process of assessing the risk of external fire spread.**

It builds on the analysis of the problem of external wall fires described earlier in the standard. The subject area is complex and assessing the risk cannot be reduced to a simple decision tree. It also cannot be based on absolute risk; the current state of knowledge means it is only possible deal in relative risk. It is equally true that any appraisal of the fire risk of external fire construction and cladding might not result in certainty. It is inevitable that there will be constraints, limitations and caveats to what is possible in an appraisal.

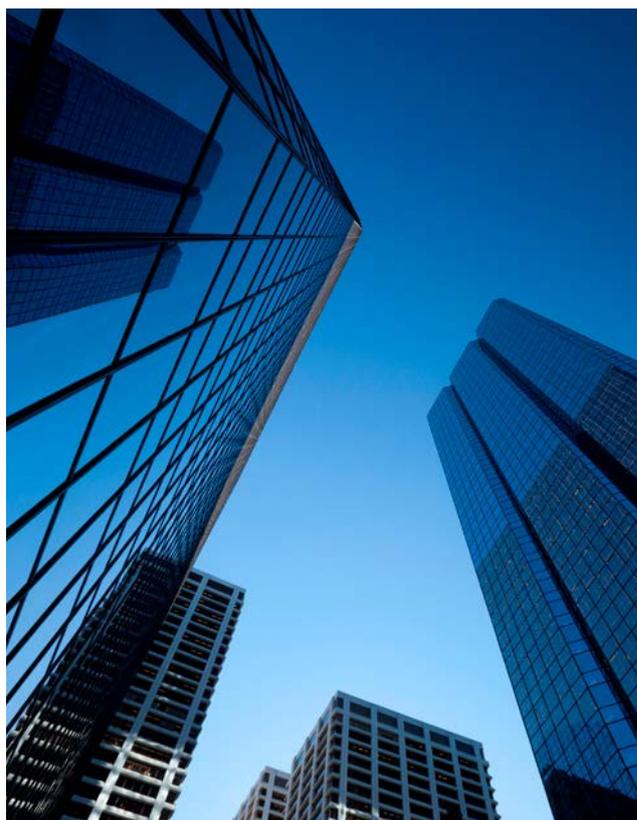
While setting out steps in a process, the standard does not intend the methodology to be prescriptive, or to constrain or dictate how it should be done. However, this clause outlines acceptance criteria to apply when rating the risk.

**Three outcomes are referred to - low, medium and high risk.**

High risk equals an unacceptable situation, justifying remediation or other significant works. Low risk on the other hand equals an acceptable situation in which the risk can be tolerated and the existing cladding or other elements of an external wall left in place. However, there will be situations in between leading to classification as medium risk. Classifying the risk as medium inevitably means there is a heightened risk of fire spread. Even so, the circumstances could be such that even this heightened risk could be acceptable.

Alternatively, a medium risk rating could dictate that further efforts are made to refine the understanding of the risk (e.g. fire testing).

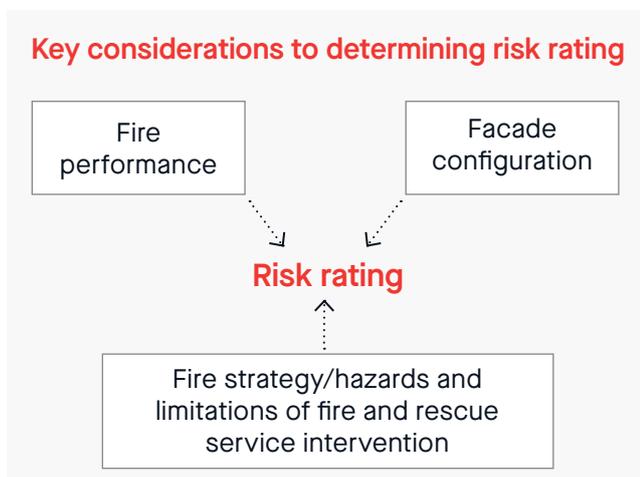
Competency underpins all the recommendations of the standard, and, in Clause 8, there is commentary regarding the necessary skills, knowledge and experience to undertake FRAEWs. Recommendations follow including that external wall assessors should understand how materials used in external walls behave in fire and should have a knowledge of the fire performance standards required for such materials. They should also be able to understand the fire strategy considerations for such buildings and be able to make judgements regarding fire hazards and fire safety features that will influence the outcome of an FRAEW.



**Clause 13** sets out the methodology and starts with a decision tree to verify that the external walls need an FRAEW.

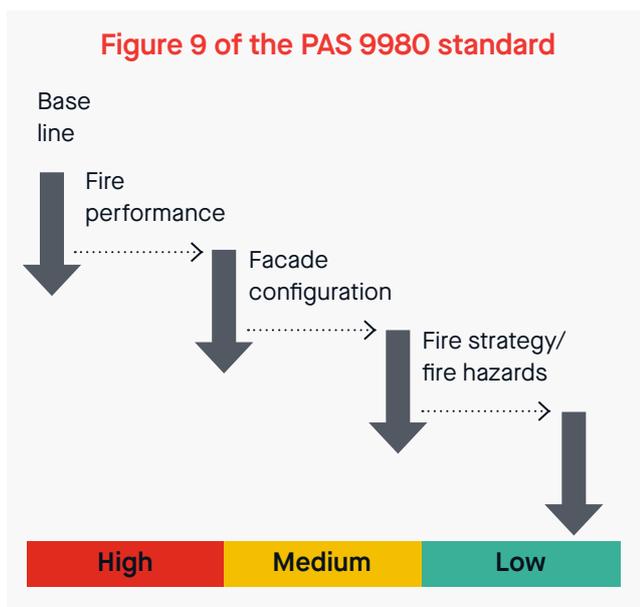
The next step in the process involves building up a body of factual evidence on the external walls and how they have been constructed. This will be drawn from a range of sources, including desktop review, visual inspection and intrusive survey.

This is used to develop a better understanding of the key factors that influence the risk. This not only includes the fire performance of individual materials and discrete components, as well as external wall systems as combined entities, but also how much is present and where (façade configuration), and the likelihood and consequence of a fire (fire strategy and fire hazards), including the limitations of the fire and rescue service in tackling a fire in the building.



This is illustrated in Figure 1 in the standard.

Risk factors determined from this information are used to formulate an opinion on the overall risk. Reference is made to tables of common attributes contained in annexes and how they influence risk positively or negatively. These factors are weighted as to their impact. At the time of writing, this weighting is qualitative, but further development of the standard may, in time, allow this step in the process to be based on quantitative analysis.



The influence these risk factors can have when considered in relation to the specific circumstances of a particular building is illustrated in Figure 9 in the standard.

Case studies to describe this process in use for some commonly found situations are contained in an annex to the standard.

**Clause 14** sets out recommendations relating to further in-depth technical assessment, which might need to be applied in certain cases where the basic level of assessment proves insufficient or inadequate in dealing with the particular materials or situation at the building.

# Conclusion

With the spiralling costs of remediation of the UK's high-rise blocks and the widening of concern now to encompass low rise buildings, there is more than ever a need for clear, concise and definitive guidance on how to understand properly the fire risk of external walls, and to put it into context within the current regulatory framework for fire safety in buildings. PAS 9980 provides this, and, along with a substantial collection of supporting guidance in annexes, gives those undertaking external wall appraisals the means to determine this risk and define its significance to the safety of residents who live in these buildings.

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## Further reading

**Building Research Establishment.** Fire performance of external thermal insulation for the walls of multistorey buildings. BR 135. Third Edition. Watford: IHS BRE Press, 2013

**Building Research Establishment.** Fire performance of cladding materials research. Report number: P111324 1019 (M9D12V4). Watford: BRE, 2020

**BS 8414-1,** Fire performance of external cladding systems – Part 1: Test method for non loadbearing external cladding systems fixed to, and supported by, a masonry substrate

**BS 8414-2,** Fire performance of external cladding systems – Part 2: Test method for non loadbearing external cladding systems fixed to, and supported by, a structural steel frame

**BS 9414:2019,** Fire performance of external cladding systems – The application of results from BS 8414-1 and BS 8414-2 tests

**PAS 79-2: 2020,** Fire risk assessment – Part 2: Housing – Code of practice (withdrawn pending development of a British Standard)



# About the author



**Steven Daws**

**Steven Daws** has a BSc in Chemistry (University of York) and an MSc in Fire Engineering (University of Edinburgh). Until recently, he was technical director of C.S. Todd and Associates Ltd, and he led the technical author team responsible for drafting PAS 9980. Other members of the team were drawn from DCCH Experts LLP, Tenos, Design Fire Consultants (DFC) and Probyn Miers (HKA Global Ltd), all eminent specialists in the field of fire safety and external wall construction and cladding. Steven has been involved in the standards making process for over 30 years, and has served on a variety of different committees, including as chair of FSH/12/4, Automatic operation of fire protection. In recent times, he has served on FSH/21/-/19, a panel set up to review BS 8414-1 and BS 8414-2, standards for the fire performance of external cladding systems that set out test methods for large-scale fire tests.

## Technical reviewer

This document was reviewed for technical accuracy by an expert in the field who has elected to remain anonymous.

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