Draft Scottish Advice Note – External Wall Systems (version 3.0)

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Scottish Advice Note:

Determining the fire risk posed by external wall systems in existing multi-storey residential buildings.

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Part 1: Introduction

1.1 Purpose

This Advice Note provides guidance for building owners / managers to assist in determining the fire risk posed by external wall systems. It will also be of interest to fire risk assessors and specialist wall appraisal experts.

For the purposes of this Advice Note, external wall systems are cladding systems (including cavity barriers and any insulation material exposed in the cavity behind the cladding), spandrel panels, window infill panels, balconies, solar shading and any other architectural feature or attachment to the external building structure.

The aim of the fire safety risk assessment and any supporting appraisal exercise should be to provide assurance that building occupants are not placed at undue risk of harm as a result of fire spread via the external wall system.

1.2 Scope

This advice note applies to existing multi-storey residential buildings of two or more storeys, including:

- Blocks of domestic flats (including sheltered, extra-care and supported flats);
- Student accommodation (including halls of residence);
- Hospitals or other premises with overnight patient accommodation;
- Care homes;
- Hotels;
- Hostels

This Advice Note is concerned with the life safety of occupants only. More stringent measures may be considered necessary for property protection or business continuity purposes but the management of such concerns are outwith the scope of this guidance.

1.3 Fire Safety legislation

Although not a legal requirement in Scotland, a fire safety risk assessment for domestic blocks of flats is recommended as best practice. Guidance on home fire safety including fire safety in high rise flats is available at https://www.gov.scot/policies/fire-and-rescue/home-fire-safety/.

Non-domestic residential premises are classed as “relevant premises” under Part 3 of the Fire (Scotland) Act 2005, as amended. A fire safety risk assessment is a legal requirement for all “relevant premises” and must “identify any risks to the safety of relevant persons in respect of harm caused by fire”.

Further information on the fire safety risk assessment process and how it applies more generally to a building can be found at https://www.gov.scot/policies/fire-and-rescue/non-domestic-fire-safety/.

1.4 The Building Standards system

The building standards system in Scotland is established by The Building (Scotland) Act 2003 (the Act). The thirty two local authorities in Scotland are appointed by Scottish Ministers as verifiers to administer the building standards system. Each local authority is responsible for their own geographic area. Guidance on the building standards system is published in a Procedural Handbook.

The building standards system is pre-emptive and is designed to check that proposals meet building regulations. The main principles of the system are:

- that a building warrant must be obtained before work starts on site and
- prior to a building being occupied, a completion certificate must be accepted by a verifier if, after undertaking reasonable inquiry, they are satisfied with the declaration by the 'relevant person' that the work meets the building regulations.

The purpose of the building standards system is to protect the public interest. It is not intended to provide protection to a client in a contract with a builder. The system is intended to ensure that building work on both new and existing buildings results in buildings that meet reasonable standards.

The standards are set out in the Building (Scotland) Regulations 2004, as amended. The building regulations apply to the design, construction or demolition of a building the provisions of services, fittings or equipment in or in connection with a building, and the conversion of a building. The regulations do not generally apply to existing buildings unless the owner intends to carry out a type of work that must meet building regulations. In general terms, work must be carried out in a technically proper and workmanlike manner, and the materials used must be durable and fit for their intended purpose.

A building warrant application will be granted by a local authority verifier where it is shown to meet building regulations at the time of application. The warrant is valid for a period of three years from the date is granted, and can be further extended by application made to the verifier before the warrant expires.

Once the building warrant has been granted it is the responsibility of the "relevant person" to ensure that the construction work meets the building regulations and is built in accordance with the building warrant. The 'relevant person' is the building owner or developer in most cases. In the case of changes made on site to the approved specification e.g. product substitution, an amendment to the building warrant should be submitted to the verifier covering the changes.

The relevant person can appoint an agent to act on their behalf if they are unsure of their responsibilities. It is recommended that this person is a suitably qualified and experienced building professional, for example an architect, building surveyor or structural engineer. Similarly, it is the responsibility of the relevant person to make sure that design or construction work is carried out by qualified and experienced building professionals, ideally registered with a reputable trade or professional body.

Once the work has been completed the 'relevant person' must submit a completion certificate to the local authority. The 'relevant person' signs the certificate which confirms that the work has been completed in accordance with both the building regulations and the granted building warrant.

A local authority must accept a completion certificate if, after reasonable inquiry, it is satisfied as to the matters certified in the certificate. Acceptance of a completion certificate cannot be, nor is it intended to be, a guarantee that all workmanship and materials are suitable. Such a guarantee would require a constant supervisory presence on site and this is a matter for the developer/owner to put in place.

Any person who submits a completion certificate containing a statement to a verifier that they know to be false or misleading, or recklessly submits a completion certificate which is false or misleading, is guilty of an offence under the Act.

The local authority has powers under the Act to serve a building warrant enforcement notice on work for which a building warrant is required which has or is being carried out:

- without a building warrant; or
- not in accordance with the granted building warrant.

1.5 Building Regulations

The Act is supported by the Building (Scotland) Regulations 2004, as amended. A schedule of mandatory building standards are provided in the building regulations and are expressed in terms of 'functional standards'. These standards are simply-stated fire safety objectives that the completed building must fulfil or allow.

The principal supporting guidance documents are the Technical Handbooks for domestic and non-domestic buildings. Following the guidance in the Handbooks is the usual route to compliance and may be relied on in any legal dispute as 'tending to negate liability' for an alleged contravention of building regulations. Alternative means of compliance is possible and the verifier has the power to decide whether or not alternative solutions fulfil the mandatory functional standards.

1.6 Benchmarks and their relationship with Building Regulations

Fire risk assessors often use guidance from a variety of sources as a means to inform their professional judgement and assessment of the risks. Current guidance within the Technical Handbooks that support the Building Regulations is often used as a benchmark to assist with the fire safety risk assessment process for existing buildings.

Benchmarks are not prescriptive or minimum standards or even recommendations. They should be used only as comparators to assess just how far removed existing provision is from current standards. The assessor must consider whether deviations from the benchmarks result in unacceptable risk and, if so, what measures may be required to reduce that risk to an acceptable level.

1.7 Fire Safety Risk Assessment and External Wall System Appraisals

A fire safety risk assessment must give due consideration to the potential for fire spread on external walls. All available evidence should be taken into account when determining the fire risk posed by external wall systems (EWS).

A key principle of fire safety risk assessment is to take steps which are "reasonably practicable" to reduce the risk to life from fire to an acceptable level. This principle applies regardless of whether or not the EWS meets current or previous requirements under building regulations.

It is recognised that on some occasions, intrusive inspection involving testing and performance assessment of EWS may be recommended (referred to throughout this Note as external wall "appraisals"). This is a highly specialised field. Such an appraisal may be required to inform the fire safety risk assessment but this will depend on the particular circumstances. The following approach is suggested:

1. An appropriately competent fire risk assessor may be able to conclude from a review of available documentation that the EWS is unlikely to pose a significant risk to life e.g. by considering a previously undertaken external wall appraisal report or other reliable supporting documentation (such as building warrant information, photographic evidence, Operation & Maintenance manual information etc). In such cases, a full external wall appraisal may not be necessary.
2. Where a competent fire risk assessor, familiar with the building type in question, is unable to reach such a conclusion or feels unable to offer appropriate remedial advice, the building owner or manager may need to seek advice of a suitably competent specialist (see Section 1.8). If there is reason to suspect that cladding might constitute a fire hazard, a detailed appraisal involving intrusive inspection and testing of samples may be recommended. Circumstances where this may be considered appropriate include:
    - The type of cladding (or insulation exposed in the cavity behind the cladding) is unknown;
    - A lack of, or gaps in, supporting records and documentation;
    - Where there is evidence to suggest that product substitution has occurred;

- Where there is evidence of systemic problems with a particular product/manufacturer/installer.
- Where doubts exist as to whether the constructed system adequately reflects the system as originally designed and tested;
- Where test evidence suggests that a system has failed to meet the performance criteria in BR 135 'Fire performance of external thermal insulation for walls of multistorey buildings' when subjected to a BS 8414 test;
- Where the test report shows an overprovision/unusual positioning of cavity barriers as tested under BS 8414 'Fire performance of external cladding systems';
- Where there are doubts over the appropriateness of accepting a BR135 system for the type of premises in question;
- Where there are doubts regarding the independence of the testing facility e.g. not United Kingdom Accreditation Service (UKAS) Accredited fire test house.

It is important that the conclusions of any detailed external wall appraisal informs the fire safety risk assessment to ensure that all hazards, risks and fire safety measures are considered holistically, and not in isolation. In addition, determining the fire performance of external wall systems will not, in itself, be sufficient to determine the fire risk posed by such systems. Therefore, either the appraisal specialist should also be a competent fire risk assessor or the findings from the appraisal should be reviewed by a competent fire risk assessor who can interpret the results and use them to inform the fire safety risk assessment. Factors which need to be considered to fully determine the life safety risk posed by external wall systems include:

- The type of evacuation strategy in use i.e. simultaneous, delayed or 'stay put' and the anticipated evacuation time should evacuation become necessary;
- The vulnerability of residents;
- The premises' emergency plan, including an assessment of staffing levels, where required for the type of evacuation method employed;
- The construction of the external walls, including any cladding and its method of fixing and the presence, and appropriate specification of, cavity barriers;
- The apparent quality of construction, or presence of building defects;
- The combustibility of other aspects of the building structure;
- The potential for exposure of an external wall system to an external fire;
- The height and complexity of the building;
- Fire protection measures within the building (e.g. fire separation/ compartmentation, automatic fire suppression, automatic fire detection);

- The location of escape routes; and
- The suitability of facilities for firefighting, including site access and water supplies.

Where EWS is thought to pose a significant risk to life, the Scottish Fire and Rescue Service (SFRS) should be informed and interim measures put in place until such times as the situation is properly remediated (see Part 3).

1.8 Competence

The consideration of external wall systems on existing buildings should be undertaken by a suitably competent professional.

Some competent fire risk assessors may be able to review relevant documentation and evidence where available, and satisfy themselves that the relevant mandatory building standards and supporting guidance in the technical handbooks have been met e.g. the external wall system meets European Classification A1 or A2 or by classification under BR 135 on the basis of the large scale fire test specified in the relevant part of BS 8414.

The Scottish Government and SFRS recommend selecting a fire risk assessor or company that is registered with a Professional Registration Scheme or is third party certificated by a United Kingdom Accreditation Service (UKAS) accredited Certification Body. More information can be found on the SFRS website and in existing fire safety guidance.

If more detailed appraisal is required (see section 1.7), it will likely be beyond the capabilities of most fire risk assessors. A suitably competent specialist with appropriate knowledge, skills and experience in construction and fire safety who understands the BR135 performance criteria and the parameters of the BS 8414 fire tests could be a chartered or incorporated fire engineer registered with the UK Engineering Council or a chartered building surveyor. These specialists can advise on the construction of the external wall system and whether remedial action may be necessary.

To find a chartered or incorporated fire engineer visit https://www.ife.org.uk/Find-a-UK-Fire-Engineer.

To find a chartered building surveyor visit the Royal Institution of Chartered Surveyors (RICS) website here.

Although not a requirement of fire safety legislation, the Royal Institution of Chartered Surveyors (RICS), the Building Societies Association, and UK Finance have developed a cross-industry approach to enable assessments of external wall systems in high rise blocks of flats to be undertaken for mortgage lending valuation purposes (EWS1 assessment form). Further information on this approach is available on the RICS website at https://www.rics.org/uk/news-insight/latest-news/fire-safety/cladding-qa/.

1.9 External wall systems documentation / evidence

It is important to understand how the design, construction, installation and maintenance of external wall systems may affect their performance in the event of fire. Building owners/managers can obtain relevant information from "as-built" drawings or the operation and maintenance manual for the building. Advice and information should also be available from the product manufacturers and/or contractors/developers about the fire performance, installation and maintenance of external wall systems

Information on the building design may also be obtained from building warrant drawings if they are available from the local authority. A local authority maintains a building standards register that contains information in two parts, part 1 containing data and part 2 containing documents. Part 1 of the register is open for public inspection at all reasonable times, and is available electronically. Part 2 contains copies of warrants and completion certificates and the principle drawings and specifications and are available for inspection during normal office hours.

The documents in Part 2 should be kept for at least 25 years but details of complex buildings or unusual structures should be kept, ideally until the building is demolished but at least for 50 years. The description 'complex' is intended to cover both occupancy and construction method. The local authority archivist and the building standards manager should agree which records are to be disposed of after 25 years, 50 years or at a later date as agreed. The procedure regulations also require registers kept under previous legislation to be retained, although they will contain less detailed information. Duty holders (owners, managing agents, etc.) have fire safety responsibilities under Part 3 of the Fire (Scotland) Act 2005 and associated Regulations and may also hold records of external wall systems.

1.10 Common types of external wall cladding

Metal composite material (MCM) panels typically include aluminium, zinc and copper. These are often used as "rainscreen" panels which prevent significant amounts of water from penetrating into the wall construction. Thermal insulation, airtightness and structural stability are provided by the second, inner part of the wall construction.

Aluminium Composite Material (ACM) cladding is a type of MCM, consisting typically of two skins of aluminium 0.5 mm thick bonded together using a core/filler material 3 – 4 mm thick. Three cores/fillers are available, each with different fire performance:

Category	Common core/filler composition	Calorific Value MJ/Kg [1]

1 (limited combustibility)	Largely of mineral composition affording a high standard of fire performance (sometimes described as A2)	≤ 3
2 (fire resistant - FR)	A mixture of polyethylene and other, inorganic additives to enhance fire performance	>3 and ≤ 35
3	Unmodified polyethylene (PE);	> 35

[1] Screen test based on BS EN ISO 1716 'Reaction to fire tests for products. Determination of the gross heat of combustion (calorific value)'.

MCM panels are popular because of their precise flatness, variety of surface finishes and colours, lightweight and formability. However, fire performance varies greatly according to the composition of the core/filler and the panels can melt, warp, disband or delaminate in a fire.

Where MCM cladding with an unknown core/filler material is identified, high rise domestic building owners are encouraged to make use of the government's free screening programme to confirm the category of the core/filler material.

High Pressure Laminate (HPL) panels are usually made by taking sheets of wood or paper fibre, layering them with a resin and bonding them under heat and pressure. The fire classification can vary significantly depending on its material properties, thickness and whether or not it incorporates fire retardant additives. HPL panels with fire retardant chemicals added are sometimes referred to as "FR grade" and may achieve Class B-s1,d0 in accordance with BS EN 13501-1 'Fire classification of construction products and building elements. Classification using data from reaction to fire tests'. Panels manufactured without fire retardant can be Class C, D or even lower depending on the thickness and make-up of the panel (e.g. fibre and resin used).

On 2 April 2020, the UK Government published the test and analysis report 'Fire performance of cladding materials research'. The aim was to identify if there were other types of cladding that burn like the type of metal composite material which was present on the Grenfell Tower i.e. aluminium composite material (ACM) with an unmodified polyethylene core, ACM (PE), or 'ACM category 3'.

The tests were undertaken by the Building Research Establishment (BRE), on advice from the UK Government Independent Expert Advisory Panel. The research showed that none of the materials tested (including HPL), performed in the same or even similarly to the type of cladding believed to be on Grenfell tower, ACM (PE).

1.11 BS 8414 Fire Tests and BR 135

Following the outbreak of a fire inside the building, if no intervention occurs, the fire may develop to flashover and break out from the room of origin through a window opening or doorway. Flames breaking out of a building from a post-flashover fire will typically extend 2 m above the top of the opening. The BS 8414 large scale façade

tests are based on this principle i.e. a post flashover compartment fire emanating from a window or door opening. The test has been designed to allow the external fire performance of both applied and supported non-loadbearing external wall cladding systems to be determined.

The BS 8414 fire test is read in conjunction with BR 135 which assesses the performance of the cladding system from the outbreak of fire inside or outside the building and spreading onto the cladding. The test facility allows cladding systems to be installed as close to typical end-use conditions as possible including the provision of fire barriers behind the cladding. The test faces consist of a vertical main test face, into which the combustion chamber is located, and a vertical return wall or wing, set at 90° to the main test face. The test specimen should be installed with all the relevant components, and should be assembled in accordance with the manufacturer's instructions. The main test face is at least 8 m high and 2.6 m wide, with the return wing being 8 m high and 1.5 m wide. BS 8414-1 is constructed from masonry and BS 8414-2 constructed using steel frame.

The test standard provides thermal performance criteria to permit the use of alternative heat sources. A wooden crib is typically used as the heat source for this test, although a gas burner can be used as an alternative. The combustion characteristics of the crib give a total nominal heat output of 4500 MJ over a 30 min period at a peak heat release rate of 3 ± 0.5 MW. The test is terminated early if sustained flaming extends above the height of the test rig. The cladding system fails the performance criteria in BR 135 where the any of the thermocouples at level 2 (5 m above the combustion chamber) exceeds 600 °C for a period of at least 30 seconds, within 15 min of the start time of the test. The fire test and reporting of the test results require a competent professional to assess the extent to which the system tested is applicable to the real building.

The UK government initially commissioned six tests, testing three types of Aluminium Composite Material (ACM) cladding with two commonly used types of insulation, polyisocyanurate (PIR) foam and stone wool; and published the accompanying explanatory note on 20 July 2017. A seventh test was subsequently commissioned, to test ACM (FR) with phenolic foam insulation.

Results of the seven tests, and accompanying advice for building owners, are available on the Building Safety Programme webpage and are summarised in the table below.

Aluminimum Composite Material (ACM) with…	Insulation		
	PIR Foam	**Phenolic Foam**	**Stone Wool**
Unmodified polyethylene filler (Category 3 in screening tests)	Test 1 failed Report	N/A	Test 2 failed Report
Fire retardant polyethylene filler (Category 2 in screening tests)	Test 3 failed Report	Test 7 failed Report	Test 4 passed Report
Limited combustibility filler (Category 1 in screening tests)	Test 5 passed Report	N/A	Test 6 passed Report

It is important to note that there are many different combinations of cladding and insulation and it is likely that products from different manufacturers will behave differently in a fire. The composition of ACM panels with fire retardant polyethylene core/filler varies between manufacturers. The average of the calorific values of the fire retardant panels (Category 2) used in the test were 13.6 MJ/kg. Building owners with this combination of materials should consult their screening tests to establish the calorific value.

Fire safety risk assessment does not routinely involve opening up construction. However, an external wall system appraisal will normally involve a degree of intrusive inspection on a sample basis to identify the type and thickness of materials used or where serious issues in structural fire protection are suspected, such as inadequate provision of cavity barriers or fire stopping. The longer rainscreen cladding remains in place the more effective the cavity barriers will perform to inhibit fire growth. Intrusive inspection is usually a one-off exercise which requires a contractor to open up construction and make good after the inspection. Materials may have been fitted or maintained differently to how the tests were specified and constructed, which can affect the fire performance of the cladding system. Where doubts exist, building owners/managers must seek advice from competent specialists that can examine the specific circumstances of their building.

Tests 4, 5 and 6 wall systems passed, which means they resisted the spread of fire over the wall to the standard set out in BR 135. These results show ways in which compliance could be achieved and offer an indication of how remedial works could be specified for those buildings that have been found to have problems.

HPL (FR) panels (Class B-s1,d0) with stone wool insulation, in the specific configuration tested, also successfully achieved the performance criteria set out in BR135, and these test results are available on the government website.

Some external wall systems may incorporate insulation products, combustible core/filler material, etc. which do not meet Class A2-s3,d2 or better (previously referred to as 'limited combustibility') and has achieved the BR 135 performance criteria following a BS 8414 test. External wall systems rely upon correct design detailing and construction of cavity barriers, fire stopping and in some cases external renders to inhibit fire spread. Building owners should seek professional advice on whether the external wall has been installed correctly, as per the BS 8414 test, and that the BS 8414 result is fully applicable to the building in question. It should be subject to maintenance in line with manufacturer/supplier recommendations.

The BRE maintain a list of external wall cladding systems which achieve the BR 135 criteria when tested to BS 8414, but the list is not comprehensive http://www.bre.co.uk/regulatory-testing. Cladding systems not on the list, but tested to BS 8414, may or may not satisfy BR 135 performance criteria. Reports from other UKAS accredited test laboratories may be considered, where available, relevant and appropriate. It is important to understand that the test results are highly sensitive to minor variations in design, construction and parameters used in the test. These minor variations can lead to different fire performance outcomes from materials which are of a broadly similar product description e.g. ACM Category 2. It is essential that cladding system installed accurately reflect the system as tested, for the data to be meaningful. It is also essential that a suitably competent professional confirm that the BS 8414 result is applicable to the particular circumstances, geometry, and make-up of building in question.

1.12 Fire statistics

Fire related deaths and injuries in Scotland have declined significantly in the last 20 years. In 2001 there were more than 8000 accidental dwelling fires per year in Scotland resulting in 88 fatalities and more than 2000 injuries. Since then, there has been a downward trend on accidental dwelling fires to approximately 5000 resulting in 40 fatalities and 900 injuries. Less than 1% of accidental dwelling fires in multi-storey residential buildings spread beyond the floor of fire origin. Most fires are contained to the item first ignited and to the room of origin.

There have been no fire related deaths beyond the dwelling of fire origin since statistics were transferred in 2009 to the Scottish Fire and Rescue Service from the Home Office.

Part 2: External Wall Systems

2.1 Introduction

An assessment of the fire risk posed by external wall systems should form part of any fire risk assessment. The cladding assessment is only one aspect to be considered as part of the overall assessment of risk. Where external wall systems are deemed to pose a risk to life on any building, reasonable steps must be taken to reduce the risk to an acceptable level. See Part 3 for Interim Measures.

For the purposes of sections 2.2 and 2.3 below, MCM panels means Category 3 MCM with an unmodified polyethylene (PE) core/filler constructed from aluminium, zinc or copper. The guidance in those sections apply regardless of building height.

2.2 MCM Category 3 cladding: extensively clad buildings (regardless of height)

In light of the Grenfell Tower tragedy and considering the evidence from subsequent Ministry for Housing Communities and Local Government fire tests, it is strongly recommended that any extensively clad external wall system incorporating Category 3 MCM should be removed from all residential buildings without delay.

2.3 MCM Category 3 cladding: partially clad buildings (regardless of height)

The risk posed by Category 3 MCM partial cladding on buildings should be assessed. Where a simultaneous evacuation plan has been put in place instead of the usual 'stay put' strategy which is common in blocks of flats, a change to simultaneous evacuation should only be temporary until the risk which caused the change of policy has been removed.

The following scenarios are examples that should be considered as part of the fire risk assessment:

a. The MCM cladding crosses any vertical or horizontal fire separation/compartmentation lines or cavity barriers:

- Where MCM cladding is present on the exterior wall of the building, fire separation may be breached if the cladding crosses these lines, enabling a fire to spread.
- MCM crossing a cavity barrier could enable a fire to spread.

Note that a vertically aligned partial band of MCM creates a greater risk of rapid fire spread vertically up the building than a partial horizontal band.

b. The MCM is located around entrances, exits (including fire exits), means of escape and other apertures in the building envelope which would pose a risk from falling debris:

- In the event of a fire, occupants need to be able to exit the building safely, and fire fighters may need to enter the building. If there is MCM cladding around entrances, exits and fire escapes this could limits the scope to successfully evacuate the building and fight the fire.
- Other apertures in the building envelope which may pose risk include areas around windows, balconies and other features such as solar shading and shutters as well as service penetrations such as vents, cowls, ducts etc.

c. The MCM is located at or near to ground level and could therefore be vulnerable to accidental or deliberate exposure to fire:
   - it should be removed or protected against ignition if it could be vulnerable to either accidental or deliberate ignition which could compromise safe access to and exit from the building.

d. The location of the MCM could enable a fire to spread to a neighbouring building:
   - it may require to be removed if it could enable fire to spread to a neighbouring building e.g. presenting a radiative hazard.

A competent professional (see section 1.8) will be able to identify if these circumstances exist in individual buildings on a case by case basis.

2.3.1 Other factors to consider for buildings partially clad with MCM

In addition to those listed above there are other factors that competent professional advisors should consider when advising whether it is safe to leave MCM cladding systems in place. Although this list is not exhaustive, competent professional advisers should consider all of the following factors and engage competent specialists where required:

a. The distance between MCM panels:
   - If the MCM does not itself cross any lines of separation or compartmentation could the fire spread to the nearest next panel and beyond in any circumstances? A competent specialist should be able to calculate the likely radiant heat flux, size of any flame, as well as how it might behave in differing weather conditions, and whether it could ignite another panel even if they are not directly located adjacent to each other.

b. The position of the MCM:
   - The position of the MCM on the building will determine the potential for it to be involved in a fire. Fire can arise internally and break out of the building envelope via unprotected openings (e.g. windows).
   - External fires can arise from combustible material located around the base of the building, e.g. vehicles, waste storage areas.
   - MCM should be removed if there is any possibility it could enable a fire to spread and compromise life safety measures such as vents at the top of staircases on roofs for example.

c. Whether a fire could spread down the building:

- There is potential for debris from panels to fall downwards and cause fire to spread to other combustible items on buildings, including other cladding panels and any items on balconies.

d. Evidence that the cladding system has been installed correctly:

- This may require intrusive inspections where there is doubt about the presence of components such as cavity barriers.

e. Indicators of diligent management and maintenance of the buildings, for example:

- The general state or repair of the building structure as well as fixtures and fittings.
- Evidence that the building, including the cladding system, is being properly maintained.

f. Whether or not the building has an up-to-date fire risk assessment and external wall systems appraisal:

- building owners may be required to undertake an intrusive external wall system appraisal if they intend to leave MCM panels in situ (see 1.5).

g. Any considerations relating to how the fire and rescue service will tackle the fire, for example:

- The operational plan to tackle a fire – i.e. would fighting the fire put the fire-fighters at risk? Even if residents could be evacuated would the risk to firefighters increase?
- The presence and operability of fire safety installations in the building, including sprinklers and smoke alarms etc. These should be considered alongside the evacuation strategy and location of MCM externally – internal measures would not by themselves prevent an envelope fire having consequences on the occupants of a building.
- The presence and operability of fire-fighting equipment in the building, including dry or wet risers, hoses and smoke ventilation systems etc.
- The number and safety of evacuation routes, including staircases.
- The difficulty of putting out a fire with MCM cladding shielding water jets from reaching the flames effectively.

h. Where there are residents who require extra assistance to evacuate:

- There is a greater risk to life in high rise buildings which are, or could be in the future, occupied by people who require extra assistance to evacuate.

2.4 Buildings of 11 m or over

On the 1 October 2019 building regulation guidance requires that external walls in taller domestic and non-domestic buildings do not contribute to the development of fire or to vertical fire spread up the facade of the building. The 11 m storey height threshold is based on the reach capability of a fire and rescue service ground mounted water jet where there is sufficient pressure and flow in the water main. In addition, external rescue by the fire and rescue service above this height would depend on the availability of specialist height appliances and adequate site access. Cavity barriers are intended to prevent unrestricted fire spread behind the external wall cladding. Panel deformation could allow fire to by-pass cavity / fire barriers but this is assessed in the BS 8414 test against the performance criteria in BR135.

The 11 m threshold recognised in the Technical Handbooks applies since 1 October 2019 to new building work. Failure to comply with current building regulations does not make the building unsafe, so there needs to be flexibility when using these benchmarks for existing buildings. Each risk assessment / appraisal must be building specific. It is therefore possible that some buildings less than 11 m may require remediation to reduce risk; equally, it is possible for lower risk buildings above 11 m to fall short of the benchmark, without it posing an unacceptable risk to life. At all times, the key question must be whether the presence of the external wall system poses a risk to life.

Where there are doubts, or minor departures from the benchmarks, a range of other factors should be considered (see section 1.7) e.g. height and use of the building; information on approval by a building control verifier; height, position and extent of cladding on the building; access for fire service vehicles and equipment; likelihood of spread from existing buildings; potential for fire-raising / bin store fires, car parking locations; internal fire protection measures including compartmentation, fire detection and warning systems, fire suppression systems, etc.

From 1 October 2019, Technical Handbook guidance for new work requires external wall cladding systems on buildings of 11 m or over to be constructed of products achieving European Classification A1 or A2 (limited combustibility). Alternatively, the guidance provided in BS 8414 and BR135 may be used, where endorsed by a suitably competent professional. BS 9414 ‘Fire performance of external cladding systems’ provides additional information on the application of results from BS 8414 tests. This guidance also applies to hospitals and care homes regardless of height. This should be used as a benchmark for the risk assessment process / external wall system appraisal.

Some products in existing residential buildings are likely to have achieved Class B-s3,d2 or Class 0. These classifications are not, on their own, evidence that a system is safe. The combustibility of the material beyond the direct surface of the product may contribute to fire spread over the external walls of buildings and therefore should be included in the assessment as a whole (such as the core/filler materials of metal composite panels or sandwich panels). It may be appropriate, subject to advice from a competent specialist and supported by test evidence, to retain

cladding panels achieving class B-s3,d2 if any core/filler material within the products and any insulation material achieves Class A2-s3,d2 or better.

2.4.1 Metal Composite Material (MCM) Cladding (see 2.1/2.2 for MCM Category 3)

If it is suspected that other categories of MCM e.g. Category 2, pose a significant risk to life safety - e.g. if it is not A1/A2 or a system has failed a BS 8414 test and BR 135 assessment, or is yet to be tested - the advice of a suitably competent specialist will be required to determine what actions, if any, are necessary to reduce the risk to life to an acceptable level. The fire safety risk assessment should also be reviewed.

2.4.2 High Pressure Laminate (HPL)

Class B HPL with stone wool insulation met the BR 135 performance criteria when tested to BS 8414 and may be considered to be safe, subject to confirmation by a suitably competent specialist. Where Class C/D HPL or any HPL used in combination with combustible insulation is found on existing buildings, BS 8414 test evidence should be requested to support its use, which should also be fully justified in the fire safety risk assessment. Where this is not the case or doubts exist over safety, advice should be sought from a suitably competent specialist and the fire safety risk assessment reviewed. Remedial action may be required. The advice on building partially clad with MCM Category 3 in clause 2.3 can also be used for buildings partially clad with HPL. The research in clause 1.10 can also be used to inform the cladding assessment by a competent professional or specialist.

2.5 Buildings under 11 m

For buildings under 11 m, the fire safety risk assessment must also take into account the factors in section 1.5. Notwithstanding the earlier guidance on MCM Category 3 systems, it is recognised that there may not always be the same degree of risk to life in a building which has a storey height less than 11 m, compared to taller buildings.

As noted above, the 11 m storey height used by the Technical Handbooks is based on the reach capability of a fire and rescue service ground mounted water jet where there is sufficient pressure and flow in the water main. As a result, Class B, C, D or E is generally allowed for external wall systems if the building is more than 1 m from the boundary of an adjacent building and has a maximum storey height <11 m. In many cases, this will not pose an unacceptable risk to life and is likely to be acceptable. That said, it should be remembered that fire service vehicular access and mains water pressure may be inadequate in existing buildings and potential detrimental changes in the future could further impact on risk. To guard against this, it should be a guiding principle of the fire safety risk assessment process to ensure that occupants can escape safely without an over-reliance on fire service intervention.

Some buildings are considered higher risk, regardless of height due to the vulnerability of occupants and other factors. Consequently, all new hospitals, care homes, places of entertainment and assembly buildings must generally comply with

the benchmark for buildings over 11 m, regardless of height i.e. achieve Class A1/2 or BS 8414/BR 135 compliant. In existing buildings under 11 m, remediation, if required, may only be necessary for buildings which are considered higher risk e.g. hospitals, care homes and other premises with delayed evacuation.

2.6 Spandrel panels

Spandrel panels (including window panels, infill panels, etc.) are part of the external wall of the building and are provided for both aesthetic and functional purposes. Like the rest of the external wall, the panels are generally required to meet acoustic, thermal, moisture, and fire performance requirements. They are not normally loadbearing but are often designed to account for wind loading.

The design and materials of panels varies between buildings; some are made of singular components such as cement particle board, other panels are composite products comprising outer facing materials bonded to an inner core/filler which may include combustible insulation.

Building owners should check the materials and products used to ensure that they do not present a risk of fire spread over the wall to an extent which could endanger life. It may not be readily apparent what materials are present, particularly for composite products which can include inner combustible insulating cores/fillers. Where sampling of the panel has been carried out, care should be taken to remediate any damage to the panels which would otherwise increase the fire risk (e.g. by exposing a combustible core/filler).

Note that vertically aligned spandrel panels or window infill panels create a greater risk of rapid fire spread vertically up the building than a horizontal band.

2.7 Balconies

The design and construction of balconies should not facilitate fire spread over the external wall to an extent that would pose a risk to life. There are indications that fires on balconies are becoming more common. The most common causes of such fires are wilful fire raising, careless disposal of smoking material and misuse of barbeques. Often, the severity of these fires is increased by combustible materials, such as furnishings or discarded materials stored, or used, on the balconies.

Balcony fires have occurred which have led to rapid external fire spread. BRE Global published examples in their 2016 report “Fire safety issues with balconies” which can be accessed at: www.bre.co.uk/filelibrary/Fire and Security/FI---Fire-safety-and-balconies-July-16.pdf. The report identifies additional risks from insulation materials used to prevent heat loss that may increase fire spread. It concludes “…the potential remains for a fire in a balcony…to pose a significant life safety issue”. The risk is clearly exacerbated if there are significant areas of combustible cladding in close proximity to a balcony.

Building owners/managers should be aware of the materials used in the construction of balconies. This will enable them, or their fire risk assessor, to better understand the risk of external fire spread so they can decide whether further action is required to manage this risk. Particular attention should be given to wooden balconies. Also, where balconies have been infilled and incorporated into flats, fire separation and fire stopping between flats should be checked.

Where there is doubt over the materials used, or risk presented, building owners should seek professional advice. Where it is assessed that there is a likelihood that rapid fire spread could pose a risk to life, building owners should seek professional advice and take appropriate action to address that risk.

Fire risk is increased when balconies are used as storage areas. Building owners may have policies on balcony use and storage and should review these to take account of the findings of the fire safety risk assessment. They should also engage with residents to develop their understanding of these risks and to share the significant findings of the fire safety risk assessment.

In order to comply with current building regulations guidance, where the building has a storey at a height of more than 11 m above the ground balconies should be constructed of products achieving European Classification A1 or A2. Where this benchmark is not possible, the advice of a competent professional should be sought.

2.8 Other attachments

There is a risk of vertical fire spread from other attachments to an external wall including solar panels and solar shading. Solar shading are devices attached to an external wall to reduce heat gain within a building by deflecting sunlight. Fire-fighters may not be able to apply a water jet from a fire-fighting hose directly onto a fire that has spread onto specified attachments high above the ground.

Where the building has a storey at a height of more than 11 m above the ground, specified attachments should be constructed of products achieving European Classification A1 or A2. Where this benchmark is not possible, the advice of a competent specialist should be sought.

2.9 Green Walls

Green walls (also called living walls) have become popular in recent years. Best practice guidance can be found in 'Fire Performance of Green Roofs and Walls' published by the Department of Communities and Local Government.

Part 3: Interim Measures

3.1 Introduction

Interim measures are likely to be required where it has been confirmed that an external wall system (EWS) is unsafe and poses a risk to life. Where required, they should be implemented without delay. Once in place, the removal or remediation of unsafe EWS should be carried out as soon as possible.

The Scottish Fire and Rescue Service (SFRS) must be notified where unsafe EWS have been identified. Failure to do so may put fire-fighters and residents at risk. SFRS will work with the building owner or manager to ensure that proposed short-term interim measures are appropriate and may re-visit once they are in place.

The fire safety risk assessment for the building should have been reviewed by a competent risk assessor when the problem was first identified and will need to be reviewed again once an EWS appraisal has been carried out. It should set out both interim and longer term remedial actions, where required, in an improvement plan (also known as the action plan) and include timescales for completion. If no fire safety risk assessment has been carried out, or material changes have taken place since it was last reviewed, the services of a competent risk assessor should be sought as soon as possible.

For domestic buildings, such as high rise blocks of flats, a competent risk assessor will advise whether a 'stay put' strategy is still appropriate for the building or if the risk is such that a temporary simultaneous evacuation strategy should be adopted. Building owners/managers should discuss this further with the SFRS. They can offer advice and will, where necessary, update their operational procedures. In making a determination, the competent assessor will need to take into account a number of factors, including (but not necessarily limited to) the following:

- The fire and rescue service attendance time.
- The general fire precautions in the building.
- The height of the building.
- Provision of sprinklers or other automatic fire suppression systems.
- The number of flats.
- The ability of residents to evacuate the building without assistance.
- The type of cladding system (e.g. Category 1, 2 or 3 MCM and type of insulation).
- The extent of the cladding system.
- The number of means of escape stairways.
- The proximity of the cladding system to windows or vents within common parts, particularly the stairway(s).

- Risk of external ignition of the cladding system (e.g. taking into account the height at which the cladding starts, proximity of cars etc. to the cladding).
- Risk of internal ignition of the cladding system (e.g. from fires inside the building via unprotected window reveals and the proximity of ignition sources such as domestic appliances).
- The collective effect of the fire safety measures considered holistically, as opposed to each measure in isolation.

Where a simultaneous evacuation strategy is adopted, it will need to be properly managed. This may require a "waking watch" on a 24/7 basis. Even where a 'stay put' policy is to continue, a "waking watch" might still be appropriate. A simultaneous evacuation policy is also likely to necessitate a fire alarm system to alert residents of the need to evacuate, unless there are sufficient staff in the "waking watch" to detect fire and initiate an evacuation at an early stage of a fire in the building. SFRS can provide further guidance, based on 'Guidance to support a temporary change to a simultaneous evacuation strategy in purpose-built block of flats (2018)' published by the National Fire Chiefs Council. Contact SFRS for further details.

In cases of extreme risk, consideration may be given to moving some or all residents out of the block until satisfactory remedial work is completed. Where some residents remain, access to the building will require careful management while works are ongoing.

Engagement with occupants/residents will ensure that they fully understand the emergency fire procedures in the building, and fire procedure notices may need to be updated. This is particularly important where a 'stay put' strategy is temporarily being changed to simultaneous evacuation, pending replacement of the cladding.

3.2 Recommended Interim Actions

- Any potential routes for fire spread from the interior of the building out onto, or into, the cladding system should be checked. This would include, for example, the presence and integrity of cavity barriers, and the risk of ignition to the external wall system via window surrounds and fitting details.
- Checks should be made to ensure that there are no combustible materials (e.g. storage of refuse) in the vicinity of the cladding system and that steps are taken to prevent accumulation e.g. temporary barriers or instructions to residents.
- Balconies should be free from any ignition risks: the use of electrical appliances or heaters within affected balconies should be avoided. Residents should be advised not to smoke or have barbecues on balconies.
- Car parks in which a vehicle fire could impinge on cladding should be closed.
- Flat entrance doors, and doors that open onto escape corridors and stairways, should be checked to ensure they are fire-resisting and effectively

self-closing. Further guidance on fire doors can be found in Scottish government fire safety guidance.

- Bin rooms, plant rooms and electrical cupboards should be kept locked shut at all times. Plant rooms and electrical cupboards should not be used to store combustible items. Larger unwanted items left in bin rooms should be uplifted as soon as possible or removed to secure, dedicated storage areas.
- There should be a clear policy in place to ensure common parts and escape routes are maintained as sterile. This policy should be enforced by regular walk rounds by caretakers or members of the resident committee.
- Walls that separate flats, plant and store rooms, etc. from escape routes should be checked to ensure there are no obvious routes for fire or smoke spread (e.g. holes where services, such as pipes and cables, pass through walls).
- Where provided, smoke control systems and associated fire detection systems, should be tested and maintained in good working order. More information can be found in Scottish Government fire safety guidance.
- Facilities provided for fire-fighters, including fire-fighting lifts and dry or wet rising mains should be checked and any concerns reported to SFRS who will, if they have not already done so, carry out an inspection to ensure functionality.
- Sufficient roadway access and hardstanding for firefighting vehicles should be maintained.
- Residents must be advised to check that smoke and heat alarms are present and working in their flat and advised to report any fire safety concerns to the building owner/manager e.g. the presence of combustible materials in escape routes. They should understand the purpose and importance of any short-term interim measures being taken.
- It will be necessary for those responsible for domestic premises to co-operate with any commercial premises within the building to ensure they do not impose any significant risk.
- Residents in domestic premises should be encouraged to request a Home Fire Safety Visit (HFSV) as soon as is practically possible.
- In premises where appropriate and practicable, an up to date list should be held of any occupants who may require additional assistance in the event of a full evacuation. This should be made available to SFRS in the event of an incident.
- Maintaining existing fire safety measures should be a priority and repairs carried out as a matter of urgency.
- The external perimeter of the building should be checked for any potential fire risks which are in close proximity that may be vulnerable to wilful fire raising.

- It should be ensured that appropriate security measures (e.g. electronic access control) are in place and maintained to mitigate the risk of wilful fire raising. Effective lighting should be provided internally and externally and, where appropriate, CCTV may be considered particularly on entrances and external facades. This may reduce loitering or disorder and identify at an early stage, any potential for external fire spread prior to an FRS arrival.
- Fixed electrical installations should be subject to periodic inspection and test every five years in the case of the common parts, and every ten years for the installations in the flats. Where homeowners have any concerns, they should seek advice from a qualified electrician.
- Portable appliance testing should take place to reduce the risk of fire from electrical appliances, where appropriate.
- Any lightning protection systems should be subject to regular maintenance.

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