Local Government and Communities Committee
Building regulations and fire safety in Scotland
Mineral Wool Insulation Manufacturers’ Association (MIMA)
additional briefing

Following the Local Government and Communities Committee evidence session on building regulations and fire safety on 20 November, I am writing to you on behalf of the Mineral Wool Insulation Manufacturers Association (MIMA), the UK trade body providing an authoritative source of independent information and advice on non-combustible insulation, to submit an additional briefing ahead of the Committee’s follow up session on 22 January. MIMA has been campaigning for years for stronger fire safety regulations, an issue of paramount importance in the UK since failings were exposed by the tragedy at Grenfell Tower.

Section one: MIMA response to EPFA submission

We would like to respond to the submission from the European Phenolic Foam Association (EPFA) to correct some statements which referred to MIMA and to one of our members, ROCKWOOL Ltd.

EPFA Statement 1: “We note that the Fire Protection Association (FPA) participated in the ‘call for evidence’ committee meeting mentioned at the start of this letter and hope that they disclosed their participation in both the development of BS 9414 and the on-going review of BS 8414. Similarly, both the Mineral Insulation Manufacturer’s Association (MIMA) and Edinburgh University have also been active participants in both these pieces of work indicating that all of the organisations fully supported the use of these standards for the purposes of evaluating the fire performance of high-rise building façades.”

MIMA Response: The above statement is false. We have consistently and strongly argued throughout the review that BS 8414 is not capable of determining whether the façades of real-life buildings pose a risk to the safety of occupants, firefighters and others. Further, industry associations will be well aware of the inaccuracy of suggesting that participation in any standards committee equates to support for either the standard as a whole, elements of that standard, or particular uses of that standard, which makes the above statement not only incorrect but knowingly so.

Just as your committee considers a range of different topics, and members as well as those giving evidence may hold different views on the issues under consideration, our membership of the BS 8414 in no way indicates that we believe the standard is fit-for-purpose and suitable for evaluating the fire performance of high-rise building façades. Rather, it indicates that MIMA has expertise which is considered relevant to the standard and that we are actively engaged in contributing that expertise through the appropriate channels.

As the committee will note from our previous submission, MIMA believes that only non-combustible materials (Euroclass A1 and A2) should be allowed on high-rise and high-risk buildings including schools, hospitals, care homes – with
no exceptions. In relation to our concerns regarding the continued use of BS 8414 in Scotland, a detailed critique of the test is included in section two of this paper. In line with legislation introduced for high-rise residential buildings in England and Wales, we strongly believe the use of this test for approving façade systems using combustible insulation and cladding should not be permitted in Scotland.

**EPFA Statement 2:** “Indeed, one of the most compelling pieces of evidence supporting the use of the BS 8414 test is the joint demonstration by the FPA and one of the MIMA members (Rockwool Limited) at the UK fire college at Moreton-in-Marsh during May 2013. They selected this test to demonstrate the comparable performance of three insulation products when exposed directly to the heat source and the visual result conclusively shows no discernible difference between the surface spread of flame of stone-wool and phenolic foam insulation products. Whilst the UK Phenolic Foam Association had no involvement with this public demonstration, the fact that a video of the event can be found in the public domain makes it appropriate to bring it to your attention and provide the following e-link to the ‘YouTube’ website: https://www.youtube.com/watch?v=e06j3RNyaRc”

**MIMA Response:** The demonstration undertaken by the FPA and ROCKWOOL was not a BS 8414 test. The demonstration was undertaken to highlight the ‘window of risk’ during installation, when combustible materials (particularly insulation) may be directly exposed to malicious or accidental fire attack before the full system is in place. This period of heightened vulnerability to fire is not considered when BS 8414-BR 135 approval is given to systems tested with all their components in place. Further, it cannot be inferred from the demonstration that the fire performance of combustible plastic insulation is somehow comparable with the performance of A-rated non-combustible stone wool insulation.

**EPFA Statement 3:** “What this demonstration clearly indicates is that there is no robust argumentation for the preferential use of Euro-class A1 and A2 insulation products on the façades of high-rise buildings whilst imposing a blanket ban on the use of all other classified insulation products. Products with classifications of B to F can differ enormously from one another in their reaction-to-fire performance and as the FPA and Rockwool have clearly demonstrated, a class B/C insulation product can exhibit similar surface flame spread characteristics as a class A1 product because there are inevitably other factors to consider.”

**MIMA Response:** It cannot be inferred from the demonstration that the fire performance of combustible plastic insulation is somehow comparable with the performance of A-rated non-combustible stone wool insulation. As we have stated above, the demonstration was undertaken specifically to show where there may be an additional fire risk to a building during the construction phase that is not assessed by testing complete systems to BS 8414.

Further, the difference between combustible and non-combustible materials is significant and must not be blurred. The Euroclass Reaction to Fire classification system is uniquely able to effectively determine; combustibility...
(and importantly whether a material is non-combustible), ignitability, flame spread, calorific value as well as the development of smoke and burning droplets. Non-combustible products cannot contain significant quantities of combustible materials, including glues and binders, as this would prevent them from achieving a non-combustible classification. This is why this system, which generates A to F ratings for products, is used in building regulations to distinguish between products that burn and those that don’t.

Section two: BS 8414 and classification criteria

MIMA has previously advised the committee that BS 8414 and BR 135 do not provide a real-life assessment of the performance of façade systems. In this section, we detail the technical and transparency issues with the test and the association classification criteria.

Technical

- The regime provides scant guidance on critical test design details, relying instead on manufacturers’ instructions - which may or may not reflect how their systems are used on site.

- There are no window openings or other typical vents and penetrations in the test set-up – in real life, these design details can have a major influence on the development of a fire.

- The use of a wood crib as fire source is not representative of modern domestic fires – typically these are hotter and more intense.

- Accepted testing practice includes a thick aluminium frame around the burn chamber – this detail is not present around real-life window openings and protects the façade system in a way that real-life installation details will not.

- Accepted testing practice allows for the use of an unrealistic number of fire barriers.
  - For example, in tests conducted for the UK’s Department for Communities and Local Government post-Grenfell, there was an average of one horizontal fire barrier approximately every 1.6 metres on the test façade above the fire chamber, instead of one every three metres, which is common practice on buildings. There are no buildings with 1.6 metre storeys.

- The failure temperature and time are too high and too short, respectively.

- Important fire safety parameters are missing – there are currently no requirements relating to falling debris, burning droplets, horizontal fire spread.

- The thermocouples (which measure the temperature rises) can be protected by fire barriers, making it easier for a system to pass the test.

- The installation quality in BS 8414 tests represents ‘best possible’ practice, which is wholly unreflective of real-life installation quality.
• No account is taken of the inevitable variations between tested and on-site construction – for example, existing buildings will have significantly differing external wall substrates.

• There is no measurement of smoke development and smoke toxicity.

Transparency

• There is no standard form of ‘classification document’ for communicating the specific and critical design details of the construction tested.

• The test houses are not required to confirm that the individual products tested in a system have the same fire performance as the test sponsors claim they do to – this means it is not possible to verify that products sold to market are the same as the products used in testing.

• Manufacturers detail their own tests: if they choose, they can design the test to make it easier to pass.

• Test reports are not published: manufacturers can test as many variations as they wish until they get a pass result; and they don’t need to disclose the specific details of the tests, which means that installers have no idea of the design details of a tested system.

• The existing test and classification protocols do not consider whether is it either practical or reasonable to expect that components will be installed, and maintained for their lifetime, to the precise engineering-standard tolerances used in the laboratory.

In addition to MIMA’s critique, the Association of British Insurers (ABI) commissioned the Fire Protection Association (FPA) to carry out a series of carefully controlled experiments, recreating more realistic building conditions than those in which the standard tests are done, in an effort to measure what differences these factors could make in the event of a fire. Their findings prompted the review of BS 8414 and a summary of their five key areas of concern are as follows:

1. Fuel load relevance to modern materials/lifestyle: Historic work conducted on behalf of insurers on high-rise fires demonstrated that modern occupancy fuel loadings typically comprise 20% plastic-based fuels. The inclusion of plastics can both raise flame temperatures and elongate flame lengths exiting a building. Aluminium, a common external cladding material used, loses a great amount of its strength with temperature. There may be grounds to question whether the BS 8414 fuel load is appropriate for determining cladding system performance if not representative of a modern-day fire source.

2. Breaching of the cladding system by un-fire-stopped vents and ducts: Aside from the simulated window in which the fuel crib sits, the cladding system is installed in perfect form without any other breaches such as other windows, vents, ducts, or pipes. The external envelope of the building is not considered part of the
design ‘fire compartment’ and as such ‘weak’ devices that include, for example, plastic duct tubing, may be installed through the cladding system without fire-stopping. There are grounds to question whether the BS8414 test, that is conducted with ‘perfect encapsulation’ of the combustible components, adequately addresses the impact of such common design features when seeking to confirm system safety.

3. Oxygen provision to materials and allowance of ‘chimney effects’ to manifest: ‘Chimney effect’ describes a mode of burning where the rate of fire spread is significantly accelerated by the geometry of airflow delivery and smoke egress. Rain-screen cladding systems demand a void between the insulation and rear of the external panel to allow the free passage of air and water drainage to prevent building fabric damp and pressurisation issues. There is a concern that the installation of test samples within the BS8414 test regime, in association with other features described in this investigation, may prevent a realistic flow of oxygen within the test specimen and as such normal burning and perhaps the allowance of chimney effects, which might exist in practice, may be inhibited. Specifically, the sealing of test piece edges which might be open in practice, the closeness of fire stopping, the omission of vents that might fail early in the fire event, and use of non-representative void depths, will all impact on the amount of air available to support fire spread and chimney-effect burning.

4. Performance of cavity barriers: The aforementioned ‘perfect-build’ of the BS8414 test means that the only route for fire challenge is via the external cladding-material. In this situation, the cavity barriers might operate through ‘pre-heating’ in the period before the fire has broken through the external cladding material. If the inclusion of plastic vents allows direct flame passage from the fire into the void much earlier in the fire event, they will need to respond to a direct flame challenge. Since the intumescent material they are made of takes time to respond, flames may pass for a period of time before they activate and ignite material beyond the barrier. There is a concern that cavity barrier performance should be linked to the ignition properties of ALL materials they separate, but this is currently not the case and the configuration of the BS8414 test does not provide adequate challenge to confirm suitability.

5. System detailing differences between certification and in-use applications: Built-up-system testing demands that the test piece under scrutiny is designed and installed to the exact same specification as it would be for the end building application. There is concern that some testing has allowed significant reinforcement of the system with features that may benefit its ability to pass the test but might not be design features of end-use applications.

Further, experts to the Grenfell Inquiry have highlighted a number of issues with the test. Jose Torero, Professor in Fire Protection Engineering at the University of Edinburgh, wrote a report for the Grenfell Tower Inquiry, which included reflections on the technical and transparency shortcomings of BS 8414:
“Tests such as BS 8414 provide a single scenario deemed consistent with an external fire, a very limited number of measurements and a very simple failure criterion. The combination of these three characteristics does not provide a sufficiently comprehensive assessment of performance.”

“The fire source, the focus on flame spread and duration of the test in BS 8414 all mask the role of the insulation and over emphasize the role of the rain-screen [cladding].”

“The insulation has the potential to burn for a much longer time period. The duration of localized burning will be critical when defining the capacity of these fire to break back into the building.”

“Many details can be hidden within the results of the test and therefore great caution needs to be exercised when interpreting such tests. In particular, it is essential to recognize the limitations of the failure criteria and the complexities associated to its extrapolation to real systems.”

“The complexity of this façade system is such that observations and tests, such as BS 8414, do not provide sufficient information to be able to reach incontestable conclusions.”

Dr Barbara Lane also strongly criticised the specific BS 8414 tests run at the BRE for DCLG in the summer of 2017: “I don’t take anything from those tests because I don’t consider them to be relevant because they are so far away from the kind of construction detailing that people like me have to deal with in our profession.”

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