

# SAFE AS HOUSES?

Construction product safety has been highlighted in the wake of the Grenfell fire, with the Hackitt review pointing to serious weaknesses in the testing and certification regime. **Thomas Lane** unravels the complexities of the present system and asks what needs to change

Earlier this month, police investigating the Grenfell Tower tragedy revealed that a door from the building, rated to resist fire for 30 minutes, lasted only 15 minutes in a test. This is the latest example of a building product performing below expectations, the most notable being the cladding that allowed fire to spread so rapidly up the sides of Grenfell Tower last June. This comprised aluminium composite material (ACM) rainscreen panels, featuring a polyethylene core sandwiched between two thin skins of aluminium.

Since the Grenfell disaster nearly 300 residential towers featuring the same type of cladding have been identified. In most, if not all, instances, it is likely these towers were signed off in good faith by people who believed the products complied with Building Regulations and were therefore safe.

How did this happen? Product performance is defined by British and European standards that set out test criteria, including on how the product performs in a fire. The guidance in the Building Regulations references these standards, so if the product meets the level of performance set out by such a standard then it is considered safe to use and will be signed off by Building Control. Therefore product standards and the testing underpinning these standards could be said to be the bedrock of Building Regulations. Get these wrong and, as we know, the consequences can be disastrous.

Dame Judith Hackitt's interim report into the Grenfell tragedy picked up on this weakness (see Hackitt's interim findings on product testing, right). She described the product testing and certification regime as unclear and said products were being marketed with data presented in ways that could be misinterpreted, and she called for this to be addressed.

Concerns include the widespread, unregulated use of desktop studies that take the results of full-scale fire tests on cladding systems and then model variations to the specification to demonstrate equivalent fire performance. In addition to that, there are differences between the British and European standards covering combustibility, and in some cases manufacturers are allowed pick under which standard they wish to test their product.

Here we take a look at how the critically important product testing regime works with reference to external fire performance on buildings over 18m tall, consider where it might be falling short and ask how this could be fixed.

## Routes to compliance

There are several routes to compliance with Part B, the building regulation covering fire. The first is to follow the prescriptive guidance, which requires insulation and filler materials on buildings over 18m tall to be of limited



SAMFROST / FIRE PROTECTION ASSOCIATION

Dame Judith Hackitt's interim report into the Grenfell fire has described the UK's product testing regime as 'unclear'

## HACKITT'S INTERIM FINDINGS ON PRODUCT TESTING

### Weaknesses in the system

- Current methods for testing, certification and marketing of construction products and systems are not clear
- Products are marketed with specification data presented in ways which can easily be misinterpreted
- Individual elements are being used as part of compound systems that are not being fully tested as systems
- The widespread use of desktop studies to assess equivalence of products and systems is not properly managed or controlled in terms of both the circumstances in which they can be used and the qualifications and experience of those undertaking them
- Test results, desktop studies, and the details of those who produce them, are not made public
- A number of people engaged in the system have said that the test conditions used do not adequately reflect real-life conditions
- The integrity and efficacy of product and system classifications are highly dependent on correct installation by competent and knowledgeable persons.

### Indications of how the system needs to change

- The government should significantly restrict the use of desktop studies to approve changes to cladding and other systems to ensure that they are only used where appropriate and with sufficient, relevant test evidence. Those undertaking desktop studies must be able to demonstrate suitable competence. The industry should ensure that their use of desktop studies is responsible and in line with this aim
- It is important that products are properly tested, certified and marketed clearly, and that desktop studies are only used when appropriate, to ensure that suitable materials are used on different types of buildings, delivering the multiple different standards required. During phase two of this review, the case must be examined for a requirement for product testing data to be made transparent and publicly available and for a much clearer system of product classification and labelling.

## PRODUCTS DON'T ALWAYS GET INSTALLED CORRECTLY [...] A SOLUTION WOULD BE TO MONITOR INSTALLATION USING A RIGOROUS THIRD-PARTY QUALITY CONTROL SYSTEM

ALAN KEILLER, CENTRE FOR WINDOW AND CLADDING TECHNOLOGY

combustibility, a requirement that does not mention external cladding panels. The second route allows materials not conforming to the limited combustibility criteria to be approved, provided acceptable performance can be demonstrated by a full-scale test on the proposed cladding system. The third route is to employ a fire engineer who will model the proposed

building design to demonstrate that performance will meet the requirements of Part B. Each route references multiple standards. The first two routes include ambiguities and variations – including the use of “desktop studies” in place of case-by-case testing – that it would appear have permitted the use of lower-performance materials on high-rise buildings in the UK. »



## THE REFERENCING AND CROSS-REFERENCING BETWEEN BRITISH AND EUROPEAN STANDARDS IS CONFUSING

BARRY TURNER, LOCAL AUTHORITY BUILDING CONTROL



FIRE PROTECTION ASSOCIATION

*One route to compliance with building regulations covering fire allows materials not conforming to the limited combustibility criteria to be approved, if acceptable performance can be demonstrated by a full-scale test on the proposed cladding system*

### » ■ The prescriptive route to compliance

Key to understanding this route is the way Part B references both British and European standards, depending on the product type. Some product categories are covered by “harmonised” European standards (that apply to all of Europe), including those for insulation. Compliant products are deemed to be those complying with European legislation, carrying a CE mark and are approved for use within the EU. Brexit is unlikely to change this, as UK manufacturers want to be able to export their products to Europe. Where harmonised product standards exist, British standards are withdrawn.

Harmonised standards do not exist for all product categories, and external cladding panels are among the exceptions. In these cases, the guidance in Part B refers to both British and European standards, and manufacturers can opt to use one or the other. These set out different testing regimes that are not strictly equivalent. The British standard covers the combustibility of materials, fire resistance and how easily the surface of a material propagates the spread of flame is BS 476.

The problem is that the test in BS 476 for reaction to fire is seen by many industry experts as being less tough than the European standard, known as EN 13501-1. Part B says that, under the British standard, cladding panels with a Class 0 rating are permitted, and that under the European standard they need to have a Class B rating. But the crucial point is that under the

relevant part of BS 467 only a surface test of the material is required, whereas EN 13501-1 includes the vulnerable cut edge of the panel as well. “From that point of view the European test is a better test,” explains Alan Keiller, principal engineer at the Centre for Window and Cladding Technology. “An ACM panel would give you a Class 0 rating but not a Class B, which is asked for in the Approved Document B,” he says.

“This is confusing and there is scope for manipulation, in that some products will get into a higher class under the British test than the European test.” Keiller adds that the answer would be to update Part B so it refers only to European standards. “Getting rid of references to British standards would be a first step,” he says. “I am amazed [the communities department] hasn’t got round to issuing something on this, given the confusion. That would go a long way towards addressing the issue.”

### ■ The system testing route to compliance

The second route to compliance with Part B is to carry out a full-scale fire test on the proposed cladding system. The test is carried out to the requirements of BS 8414, which includes building up a corner panel of the proposed system 6.5m high and setting fire to it in controlled conditions. If this meets the requirements set out in guidance note BR 135 “Fire performance of external thermal insulation for walls of multi-storey buildings” it is deemed to comply with Part B. Combustible insulation and

filler materials that don’t meet the requirements of Part B when following the prescriptive route to compliance often do pass BS 8414 tests where these are encapsulated within non-flammable external cladding.

### Calls for revision

There are many in the industry, notably the RIBA and insurers, who are calling for Part B to be revised so that it permits only non-combustible materials in cladding systems. This would rule out the use of foamed plastic insulation – which is made by companies such as Celotex and Kingspan – as well as combustible cladding panels.

John Garbutt, marketing director at insulation manufacturer Kingspan, is an advocate for system testing. “BS 8414 is the most aggressive fire test in the world. I would challenge anyone to find any significant fire that has got out of control on a system that has passed a BS 8414 test,” he says. “We think product tests need reforming and shouldn’t be based on individual tests but system tests, as there are so many variables in how these are put together.” Class 0 ACM cladding panels, permissible under the prescriptive route in Part B, failed government-commissioned BS 8414 tests regardless of the type of insulation used with the panels.

Critics of full-scale testing point out that the sample panels used for the tests are carefully put together in perfect conditions. Keiller at the Centre for Window and Cladding Technology: “We all know this doesn’t happen [in real world scenarios], as products don’t always get installed correctly on buildings with normal site workmanship. A solution would be to monitor installation using a rigorous third-party quality control system.”

The Fire Protection Association (FPA), the UK’s national fire safety organisation, which advises the insurance industry, is among those that would like to see an end to the use of combustible materials in cladding systems, because of the possibility of poor-quality workmanship and changes to buildings over time compromise performance.

Its technical director, Jim Glockling, says BS 8414 test panels are perfectly encapsulated with sealed edges, which does not happen on real buildings. “If you look at what’s put on a building, there are vents and pipes which aren’t sealed properly,” he says. The FPA is calling for revisions to BS 8414 to make it more realistic. These include: changing the test fuel load to include plastics in addition to wood, as plastics produce longer, hotter flames; the introduction of unprotected vents and ducts, which allow flames to penetrate into the panel; and unsealed edges, which allow oxygen to flow more freely inside the test panel – this would also produce a better test of cavity barrier performance. The FPA would also like test panels to replicate the exact same specification as that to be used on the building, as apparently minor differences such as the types of fixings could affect fire performance.

*Cladding panels were removed from many high-rise housing blocks after the Grenfell Tower fire, due to concerns over lack of fire resistance*



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### Desktop studies

Another problem with the full-scale test that is BS 8414 is that there is only one lab in the UK – at BRE in Watford – and another in Dubai capable of doing the tests. Combined with the eye-watering cost of £30,000-£50,000 per test, this makes such testing an unrealistic option for verifying cladding designs on all buildings. This has resulted in the growth of the so-called desktop study route to compliance. Building control will accept proposed cladding systems that vary from those tested to BS 8414 if these have been assessed as being compliant with the requirements of high-rise external insulation standard BR 135 by a “suitably qualified” person.

Desktop studies – which appear to have been first referenced in a BCA “technical guidance note” from 2014 – came in for particular criticism from Hackitt, who said these were not properly managed or controlled and questioned the qualifications and experience of those carrying out the studies. She called for the use of desktop studies to be significantly restricted, limiting their use to where sufficient test data existed and where they could be undertaken by people able to demonstrate suitable competence (see page 27).

## PRODUCT TESTS NEED REFORMING AND SHOULDN'T BE BASED ON INDIVIDUAL TESTS BUT SYSTEM TESTS, AS THERE ARE SO MANY VARIABLES IN HOW THESE ARE PUT TOGETHER

JOHN GARBUTT, KINGSPAN

The government has started work on updating the rules underpinning desktop studies. It announced on 15 February that it was going to revise the wording on desktop studies in Part B and said industry experts had already started work.

The British Standards Institute (BSI) has been commissioned by the government to develop a new standard, BS 9414, called “Fire performance of external cladding systems. Extended application of results from BS 8414 part 1 and BS 8414 part 2 tests”. It will set out a formal process for assessing whether varying the specification from a cladding system tested to BS 8414 will provide equivalent performance, thus bringing a degree of rigour to the desktop study route used for complying with Part B.

A wide range of variations are being considered for inclusion in the standard, including types of material, insulation thickness, reaction to fire of different elements, methods of fixing and positioning of cavity barriers. According to the BSI, the standard will not require any tests to verify the variations. It says standards normally take up to 18 months to develop, which means the new standard could go out to consultation early next year, with publication in July 2019.

The move is welcomed by Kingspan’s Garbutt. He says: “We think desktop studies are needed, as people want to use specific materials that are slightly different from the original BS 8414 test.” The Centre for Window and Cladding Technology also cautiously welcomes the proposal. Its director, David Metcalf, agrees that desktop studies are needed as it is impractical to test everything. “Any clarification around the desktop study process would help,” he says. “If we have a standard that formalises what data and evidence is required, what the changes are and the experience of the people involved – well, that is a start.”

### The professional view

The professionals who use the regulations to design and sign off buildings would also welcome greater clarity in general. “The referencing and cross-referencing between British and European standards is confusing,” says Barry Turner, director of technical policy at Local Authority Building Control. “It would be much simpler if the approved documents just referenced European standards.” He describes the work to formalise the desktop study process as “a step in the right direction”.

Chris Jarvis, technical director of architect Sheppard Robson, agrees the confusion between British and European standards needs sorting out. He would also like to see clear statements about surface spread of flame and combustibility performance in technical information and thinks it would help site workers if cladding products were physically marked to demonstrate performance in the same way glass is stamped in the corner showing the standard to which it has been tested.

Like the FPA’s Glockling, Jarvis questions the robustness of BS 8414 testing. “It’s all done inside, which isn’t representative of British weather conditions – which is where these products are used,” he says. He thinks a more robust testing regime would mean foamed plastic insulation could be used with confidence. “We are under an awful lot of pressure to reduce heat loss. Going non-combustible would increase insulation thickness by 80%. That would mean huge structural elements to take the weight: this would be expensive, and there is also the loss of space.”

Jarvis adds that if the government decided only products defined as being of limited combustibility were allowed in cladding systems then the industry would work to that. “Most architects just want clarity and consistency so we can concentrate on what we want to do – which is produce good architecture.”