White Paper No. 2.7

White Paper: Recommendations regarding fire safety on balconies in high rise residential blocks

Updated to reflect revisions to AB B published July 2019

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SAPPHIRE

Recommendations regarding fire safety on balconies in high rise residential blocks

Executive Summary

Regulations.

- A new guide (BS 8579) is currently being drafted as a specific guide for balcony design.
- The Government has published regulations banning the use of combustible materials in external walls of high rise buildings, and confirmed this now includes balconies.

Decking.

- This document identifies a solution for of Class A decking, where this is required.
- This document demonstrates the positive effects of providing a soffit where decking of limited combustibility is permitted following risk assessment.

Cavity barriers.

- This report explores the effectiveness of several details currently used in construction.

It demonstrates details which can be expected to satisfy the requirements regarding integrity and insulation of up to 120 minutes.

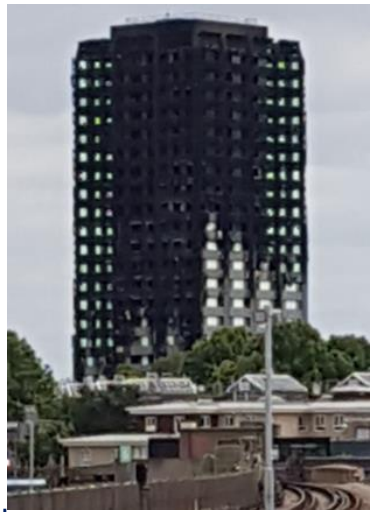
Use of laminated toughened glass

- This report summarises the recent documentation and current position.

Background

Following the tragic fire at Grenfell on 14th June 2017, this has understandably prompted a complete review of the claddings used on high rise residential buildings.

Following extensive consultation, the Government has issued revised guidance dated Nov 2018 banning the use of combustible materials in certain high rise buildings, and has confirmed this now applies to balconies.



This document seeks to collate the available information relating to balconies in such locations and to address the specific relevant requirements.

This report has been compiled using the experience of market leaders Sapphire Balconies Ltd, in conjunction with industry experts and fire authorities. It is set out in four parts;

A. The current **regulations** and compliance with these.
B. A study to evaluate ways to further mitigate the fire risks relating to balcony **decking**.
C. A study of the effects of balcony supports on cavity fire **barriers**.
D. A summary of the situation regarding combustibility of materials including **laminated toughened glass.**

PART A

1. Summary of relevant documents used in compiling this report.

a. Approved Document B2: 2013 (fire safety) volume 2: buildings other than dwelling houses (2006 edition incorporating the 2010 and 2013 and Nov 2018 and July 2019 amendments)
b. BS 9991: 2015 Fire safety in the design, management and use of residential buildings – Code of practice
c. C Holland, M Shipp and D Crowder, Fire safety issues with balconies, BRE Global Ltd 2016.
d. Centre for window and cladding technology, Standard for systemised building envelopes, Part 6, Fire performance, Sept 2008.
e. British Standard EN 1365-5: 2004 Fire resistance test for loadbearing elements- Balconies and walkways.
f. Fire performance data for aluminium extrusion can be obtained from the results of BS 476 Fire Test Series. Subject to a severe fire emerging from an apartment, the aluminium would be expected to weaken (and melt at 660 deg. C).
g. Fire stopping: 4th edition, published by Association for Specialist Fire Protection.
h. BS EN 1363-1 Fire resistance tests, including revision draft.
i. MHCLG Advice Note on Balconies on Residential Buildings, and circular 1/7/19

2. Brief description of Sapphire balconies.

a. Sapphire balconies, in common with many other balcony manufactures, are generally cantilevered from the structural floor of the parent building and do not rely on support or load sharing from balconies on upper or lower storeys. (Please note, that post supported balconies are not covered by the scope of this document as they could be the subject of disproportionate collapse)
b. The balconies are always open on one or more sides.
c. They are not regarded as load bearing members of the main building structure and do not affect the stability of the building should a balcony collapse in a fire.
d. The cantilever arms (minimum two per apartment balcony) are of galvanised steel and are not fire protected. The balcony framework is of aluminium alloy constructed as a Cassette® which slots onto the steel cantilevers.
e. The balcony walls may be of glass or metal vertical bars or aluminium clad panels.
f. The balcony floor is normally of treated wood or wood / plastic composite material.
g. The balcony soffit is normally constructed of aluminium material.
h. No combustible plastic foam insulation is employed in the cassette, hence the construction can be considered to be of low fire load.
i. Sometimes the architect may employ vertical balcony-edge screens forming aluminium tubular fins for aesthetic and functional, e.g. shading, reasons and, to avoid a chimney-effect fire, galvanised steel baffles are placed inside the fins at each floor level.
j. The balconies rarely form part of an escape route. Where they are, a suitable soffit giving ½ hour fire resistance and an intumescent fire stop may be used to prevent upward passage of fire between the parent wall cladding and the edge of the cassette.

3. Summary of relevant extracts from related documents:

a; AD B2 including July 2019 amendments.

a. Most of the regulatory guidance concerns balconies forming part of, or affecting, an escape route.
b. Sapphire balconies are rarely used in this context i.e. they are not common balconies as defined in AD B2 . They do however extend the travel distance (distance from any point in the flat to the flat entrance door)
c. Balconies are mentioned in several clauses i.e. 2.7, 2.17,2.22, 4.8, 8.13 and Table 17.
d. Balconies are now regarded as part of the external façade, and the regulations regarding use of non-combustible materials should be applied.
e. This means that any balconies located within 1m of a relevant boundary, or located more than 18m above ground level, must be entirely formed from non-combustible materials.
f. The Sapphire balcony is not load bearing in the sense that it does not support anything other than its own weight.
g. The new regulations conform that materials used in the thermal break are exempt from the requirements for non-combustibility, and indicate that laminated glass is also exempt in windows, but this exclusion does not seem to extend to its use in balustrades.

b; BS 9991

a. Again, as in AD B2, there are many mentions of balconies, but they are in relation to means of escape and are not enumerated here.
b. Clause 5.1 c) 3. It is assumed that Sapphire balconies would not be used in an atrium, but if this is so see Clause 11, Table 2
c. A3 deals with private balconies greater than 4.5m above ground level: a), b) and c)1, 2) and d) refers.
d. Informative Annex F (Fire Notice) states 'if fire breaks out in your house, do not use a balcony unless it is part of the escape suite from the building'.

c; BRE Fire safety issues with balconies

This document confirms that there is no specific guidance for balconies in AD B2 other than when balconies are designed as a means of escape.

d; CWCT, Standard for systemised building envelopes,

a. Clause 6.2 General, para 3, states 'the building envelope shall not be required to possess fire resistance unless a performance is stated by the specifier'.
b. Clause 6.3 Fire resistance, 5th para states 'Aluminium envelope systems do not normally have significant resistance to the fire. Most unmodified aluminium building systems will provide only 10 to 20 minutes stability and integrity resistance and negligible insulation resistance'
c. Clause 6.4.2.1 states 'the external surface of the envelope shall satisfy the requirements for Class 0 when tested in accordance with BS476: Parts 6 and 7'
d. (National class) or Class B-s3, d2 or better in accordance with BS EN 13501–1 (European class)
e. Clause 6.4.4.2 ii) states 'cavity barriers should be provided to close the cavity around penetrations through the rain screen for windows and doors. Aluminium and aluminium alloys show a reduction in strength at temperatures much above 100°C

and at 300°C most of the strength is lost. For this reason, unprotected aluminium window pods will not satisfy this requirement.'

f. 6.6.2 Insulation in walls of buildings with the story more than 18 m above ground level should be of limited combustibility. (This repeats AD B)

e; BS EN 1365-5

a. This standard is not called up in AD B2 at time of preparing this note.
b. This regulation outlines the test method which should be used on balconies expected to become fully engulfed in fire (a rare occurrence) , however as can be seen above there is no current requirement for these tests to be carried out on residential balconies.

f; MHCLG Advice note on balconies on residential buildings

a. Building owners should be aware of the materials used in the construction of ..balconies (regardless of height) and the potential for any horizontal and vertical fire spread due to their arrangement on the external wall.
b. The removal and replacement of any combustible material used in balcony construction is the clearest way to prevent external fire spread from balconies, and…this should occur as soon as practical.
c. Where there is doubt over the..risk presented, building owners should seek advice from an appropriately qualified and competent professional.
d. Building owners should have policies in place as to what cannot be stored and used on balconies, and communicate with residents to develop their understanding of the risks. Barbeques should not be used on balconies.

4. General conclusions to Part A

a. Sapphire balconies as described are considered to satisfy the above-mentioned guidance unless they are classified as a means of escape, or are in close proximity to another building. Where they are, a suitable soffit giving ½ hour fire resistance and an intumescent fire stop may be used to prevent upward passage of fire between the parent wall cladding and the edge of the cassette.
b. At present there appears to be no requirement for external parts of the building to remain in place if affected by fire, but following Grenfell and other recent fires (where falling debris has acted as missiles hazardous to fire fighters) it would be prudent to consider this aspect. This may become particularly important where a balcony is sited immediately above a fire service access point.
c. Balconies above 18m or close to a boundary must now have class A2 decking,
d. The most recent guidance suggests that standards for limited combustibility may not be just limited to buildings over 18m high and within 1m of the boundary and the recent MHCLG Circular Letter of 1 July 2019 suggests that lower rise and more distant buildings should be equally assessed having regard to the potential risk(s) associated with fire spread.
e. As fire spread across floors is an uncommon scenario and usually only occurs where there is high level of incident thermal radiation, the effect of the soffit should be considered when assessing the risk
f. Regarding AD B2 clause 12.7, Sapphire do use a material of limited combustibility in their thermal break. The product is generally located just above the fire barrier, and encapsulated between steel plates, so the possible exposure is extremely low. The revision to AD B confirms this meets the requirements of the regulation.
g. This information relates to regulations in England and Wales, and further checks may be required for installations in other areas.
h. Designers should be aware a balcony may extend the travel distance and that a balcony can be considered as an 'inner room' under means of escape regulations/guidance.

i. Until further clarification is received, it seems that laminated toughened glass is not suitable for use in balustrades.

PART B

6. Behaviour of decking in fire; case studies.

As confirmed in the latest regulations, Balconies within 1m of relevant boundaries now require decking to be class A2 or better. However this has not always been the case, and the effect of using combustible decking can be seen from the following examples.

This study of recent balcony fires in the UK gives a good insight into the elements of these which affect fire spread;

6.1 Greenwich

There has only been one recorded fire on a Sapphire balcony, in Greenwich. The cause of this was traced to cigarette ash igniting a piece of flammable furniture, and the fire brigade were called to put out a localised but intense fire. As can be seen from the photos below, the glass shattered in the heat, and smoke damage was caused to the balcony above. The structure of the Cassette® reached considerable heat, as can be seen from the scorching below the balcony.
While the class C wood plastic composite (WPC) decking charred, the fire did not spread either horizontally or vertically, and much of the damage to the decking (see photo below) was caused by the fire brigade cutting open the floor to ensure there was no debris inside.
The fact an aluminium soffit was in place no doubt restricted the flow of oxygen to the fire. The main structure of the balcony remained intact.


Pictures showing soffit, broken glass panel (temporary timber replacement) and limited spread of fire on class C decking.

6.2 Manchester

By comparison, a fire broke out recently on a balcony in Manchester (not a Sapphire balcony). While this again had a metal primary structure, the rafters and decking appear to be timber, and the lack of soffits allowed oxygen to fuel the fire and caused a rapid spread of flame exacerbated by combustible material on the privacy screen.

Photos showing the rapid spread of fire due to combustible privacy screen and decking, and absence of soffit.

6.3 Lewisham

This recent fire in Lewisham was contained on the one balcony (not a Sapphire balcony). It can be observed that these balconies had a solid soffit.

Photos showing severe fire contained on one balcony with solid soffit.

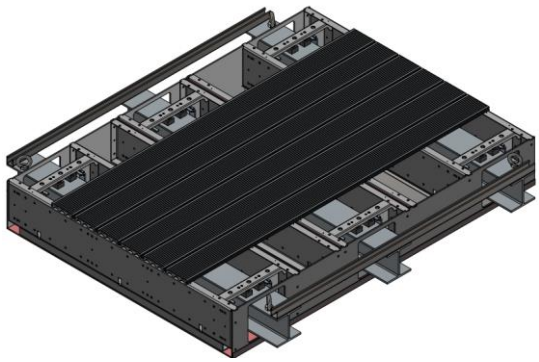
6.4 West Hampstead

The balconies in this fire in West Hampstead (not made by Sapphire) appear to have soffits and decking formed of flammable material which had a massive fire load and allowed the fire to spread rapidly smashing panels and spreading up the whole stack, despite a sprinkler within the building.

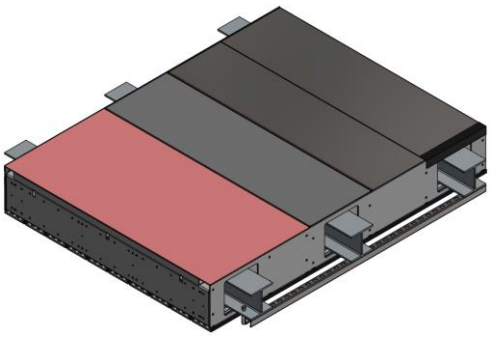
Photos show rapid spread of fire on balconies with combustible decking and soffits

7. The effect of metal soffits. Details of testing carried out by Exova Warrington.

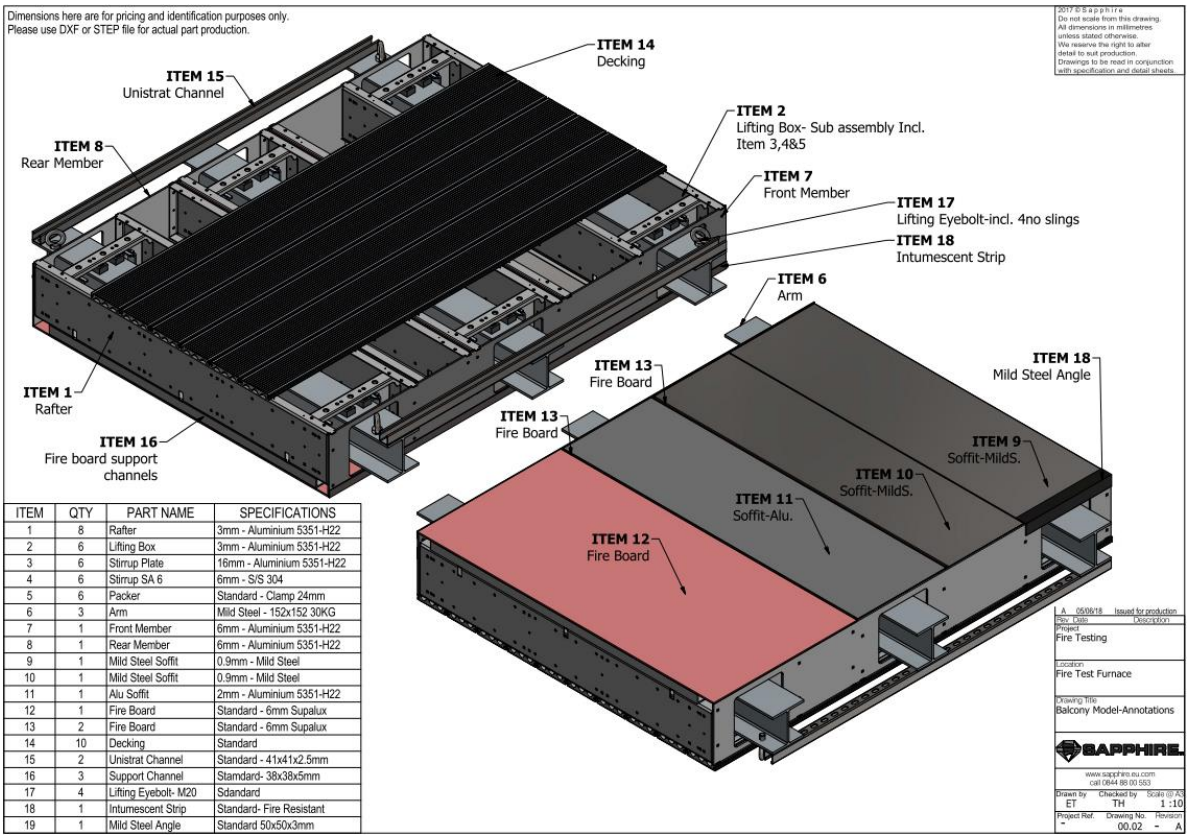
In order to better understand the protective effect of soffits on the balcony in the event of fire, Sapphire have recently commissioned some fire testing at the Exova test centre in Warrington. For one of these tests, a full-size balcony Cassette® was constructed to fit the furnace size. This was fitted with class C decking (the least non-combustible product currently used by Sapphire), and a variety of soffit panels were fitted so the relative effect of these could be monitored.
Details of the test panel can be seen below along with photos taken during the test;



View from above the test balcony (some boards removed for clarity)



View of bottom of test balcony showing range of soffit board materials tested .



ITEM	QTY	PART NAME	SPECIFICATIONS
1	8	Rafter	3mm - Aluminium 5351-H22
2	6	Lifting Box	3mm - Aluminium 5351-H22
3	6	Stirrup Plate	16mm - Aluminium 5351-H22
4	6	Stirrup SA 6	6mm - S/S 304
5	6	Packer	Standard - Clamp 24mm
6	3	Arm	Mild Steel - 152x152 30KG
7	1	Front Member	6mm - Aluminium 5351-H22
8	1	Rear Member	6mm - Aluminium 5351-H22
9	1	Mild Steel Soffit	0.9mm - Mild Steel
10	1	Mild Steel Soffit	0.9mm - Mild Steel
11	1	Alu Soffit	2mm - Aluminium 5351-H22
12	1	Fire Board	Standard - 6mm Supalux
13	2	Fire Board	Standard - 6mm Supalux
14	10	Decking	Standard
15	2	Unistrat Channel	Standard - 41x41x2.5mm
16	3	Support Channel	Stamdard- 38x38x5mm
17	4	Lifting Eyebolt- M20	Sdandard
18	1	Intumescent Strip	Standard- Fire Resistant
19	1	Mild Steel Angle	Standard 50x50x3mm

Further details of test construction

Photos showing the test balcony mounted on the furnace at various stages

As can be seen from the above images, for the first 20 minutes there was some smoke and vapour penetration, and towards the end of this time the boards started to soften, but no flame was present above the soffit.

After 25 minutes the decking above the steel soffit caught alight. The reason for this catching first was deemed to be because the steel absorbed and radiated the heat above it, while the aluminium soffit reflected the heat, allowing it to stay intact at temperatures well above the stated melting point. After 28 minutes, the aluminium soffit which could be viewed through the viewing portholes started to melt, exposing the decking above to the full heat of the furnace.

The test was finally aborted at 33 minutes, by which time the furnace temperature was some 850 degrees, and the remaining decking caught alight and had to be extinguished.

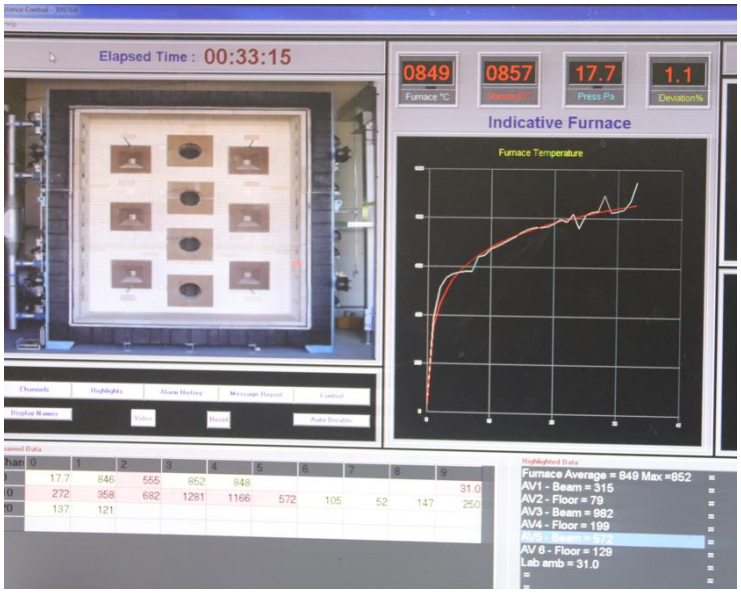


Photo of recording equipment showing the temperature curve, and the various sensor readings

At this stage, the decking was still in place, and most of the top surface still visible however the underside of the boards were heavily charred.

Photos showing the top side and underside of the boards following the test.

8. Practical fire test.

To demonstrate the behaviour of the various classifications of decking in a real fire, Sapphire have conducted a further test where live barbeque coals were placed onto a balcony decking and allowed to continue burning. To summarise the results;

Photos showing the decking during test. From left to right, Class A. class B, 2x class C , timber.

- Class C decking and Class D timber decking burned through quickly and allowed the coals to fall onto the soffit.
- The class B decking took longer to ignite but finally burned through
- The class A decking remained.

Of the coals which fell through the decking onto the soffit below;

- The timber soffit quickly burned through, and allowed the coals to fall onto the structure below.
- The aluminium soffit stayed in place.

Photos showing the effects on both flammable and non-flammable soffits during the test.

Further details and videos available on www.sapphire.eu.com/fire

9.0 General conclusions Part B

It is now mandatory that balconies located within 1m of a relevant boundary or situated more than 18m above ground level must have non-combustible decking.

9.1 Selection of decking.

BS EN 13501-1 classifies combustibility of materials. Typical deck materials can be summarised as follows;

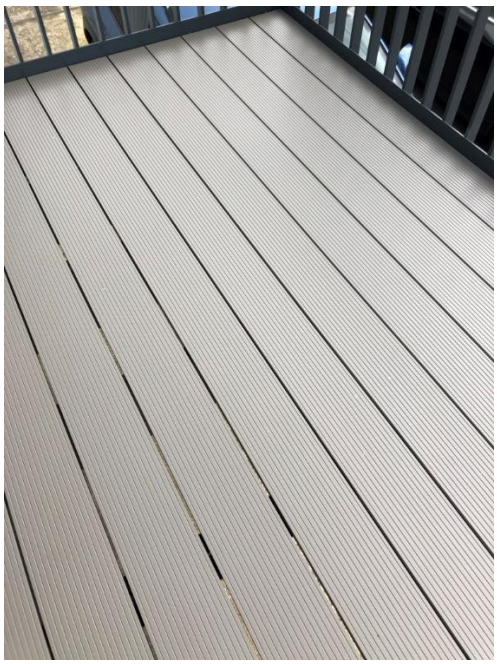
Class	Description	Examples	Criteria
A1	Non-combustible	Aluminium. Stone.	No sustained flaming
A2	Non-combustible (with minor combustible components)	Coated aluminium Porcelain on pedestals	No sustained flaming
B,	Difficult to ignite	WPC decking	Critical flux < 8 kW/m^2

C	Difficult to ignite	WPC decking	Critical flux < 4.5 kW/m^2
D,E	Normal combustibility	Some timbers	Critical flux < 3 kW/m^2

9.2 Provision of Class A2 decking.

There is some confusion as to the exact specification required, as AD B calls for A2-d1-s0 classification, whereas strictly the correct classification for flooring materials is $A2_{fl}$

In anticipation of the changes to the legislation, Sapphire have worked with MyDek to develop a ribbed aluminium decking in a range of finishes to provide a solution for when a class A decking and support structure is required. This range meets both A2-d1-s0 and $A2_{fl}$



Examples of aluminium decking and support system giving class A2 fire resistance.

9.3 Areas below 18m

For other locations, as MHCLG advice above, building owners should seek advice from an appropriately qualified and competent professional.

In assessing the risks, they may wish to take note of the following;

It would seem clear from the above findings and the advice of the Manchester chief fire officer that the presence of a suitable soffit to balconies offers a substantial contribution to limiting the spread of fire on domestic balconies, for a number of reasons including;

a) Limiting the supply of oxygen feeding the fire from below.
b) Preventing burning debris from falling from the burning balcony.
c) Reflecting and deflecting the heat rising from the fire, and thus preventing it reaching the balcony above.
d) Deflecting jetting flame from an apartment fire away from the building.

Sapphire advocate the use of aluminium soffits on all balconies. However, where soffits have been omitted or have significant perforations (for architectural or cost reasons) there is a clear evidence to suggest the use of class A decking should definitely be considered to reduce the risk of rapid fire development via the balconies.

PART C

1. Requirement for cavity barriers.

AD B2 calls for the provision of fire barriers within the cavities in external walls, to ensure that compartmentalisation is maintained. These small barriers are traditionally made from stone wool slabs or preformed elastomeric seals. Where the construction requires an open void (for example rainscreen cladding) the barrier is known as 'open state' and additional provision is required to ensure this void is closed within 5 minutes of fire being present.

The barrier must be capable of resisting fire for the required period (typically up to 120 mins for high rise residential blocks) in;

- **Integrity**; preventing the passage of flames and through the barrier and;
- **Insulation**; restricting the temperature of the unexposed (upper) surface to a maximum of 180^0 above ambient temperature.

2. Particular challenges for balcony connections.

The zone used for providing this fire barrier is usually on the slab edge. Where the slab is relatively thick, and there is a reasonable floor build up, there is often room to position the fire barrier above or below the balcony connections, and the continuity of the barrier is preserved. There is however a tendency over recent years to reduce the slab thickness (particularly where post tensioning is used) and also to reduce the floor finishes zone. The design of this barrier often becomes a significant challenge, particularly considering the conflicting requirements for structural integrity, waterproofing, thermal bridging and fenestration which are present in the same zone. Numerous solutions have been proposed and implemented in the past, but the post Grenfell spotlight on this area has highlighted the lack of specialist knowledge and specific regulations in this area.

3. Investigation into the effectiveness of fire barriers at supports.

In order to better understand the behaviour of a number of currently used details in the event of fire, Sapphire have recently commissioned a set of fire tests at the Exova test centre in Warrington to evaluate the effectiveness of a range of possible solutions. We have based these on the test regime for linear cavity seals BSEN 1366-4 and ASFP guidance document TGD17.

The specimens were subjected to British Standard fire curve furnace temperatures rising to above 1000ºC over 120 minutes and continuously monitored for integrity along with temperature recording above the insulation as shown in Fig. 4 and in the graph below. The tests have indicated a solution which gives the required level of protection, and this has been selected for additional development, independent testing and certification.

4. A solution for the customer

Whilst we are still working through the process of independent certification (which is expected to take several months) we are happy to offer the Sapphire StubGuard™ as an option to serve the need, subject to the approval of the fire engineer on the project.

This solution comprises CNC cut, dense grade, specially formulated, mineral fibre blocks, designed to fit snugly around the stub or arm – see Figs.1, 2 and 3 below. They are held together using the pre-fitted self-adhesive reinforced foil flaps at the top and bottom of the encasement and will be prevented from displacement by the positioning of the adjacent linear barrier once this is fitted.

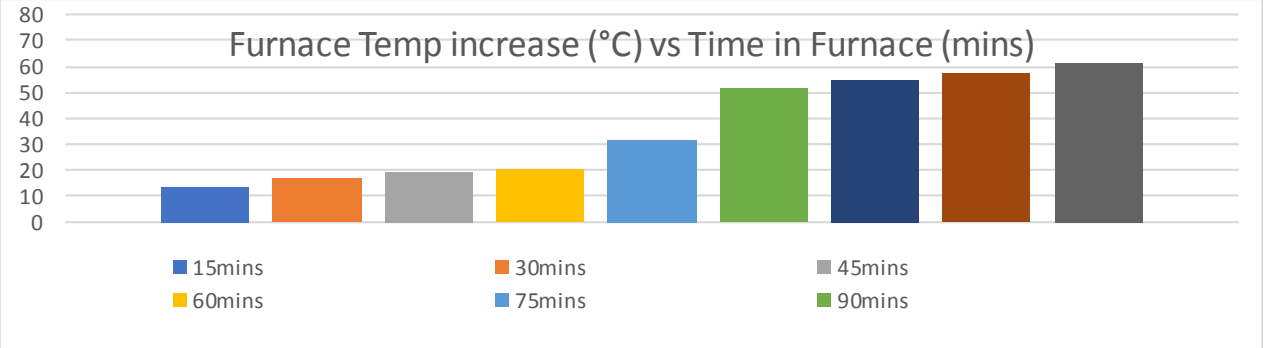


Diagram showing temperature rise at top of StubGuard™. Permissible temperature at 120 minutes = 198ºC

Fig 1 Detail of typical StubGuard™ pre-installation

Fig 2 one side of the StubGuard™ fitted

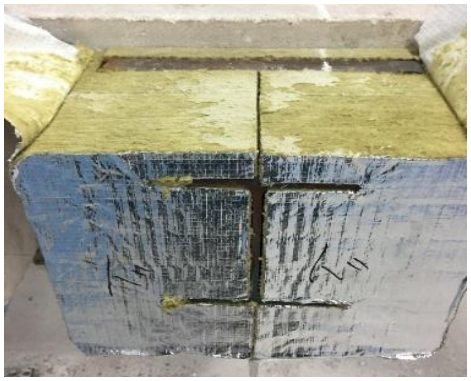


Fig 3 StubGuard™ with top foil peeled back for cl

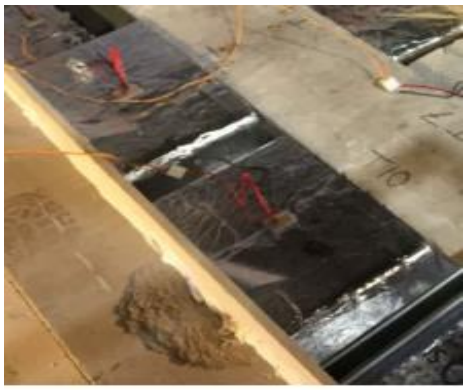


Fig.4 Testing of StubGuard™ at Exova – note sensor monitoring top surface temperature

5. Some of the benefits.

- The StubGuard™ can be simply and accurately cut to give a tight fit across the available cavity
- Easy and quick to fit
- Good solution for minimising heat loss in this critical area
- The tough reinforced foil cover provides a good surface for adhesion of a waterproof membrane
- Installer inconsistencies are minimised – adhesive flaps pull and hold the two halves together
- Very large margin of safety between the fire insulation test result and the permissible maximum temperature

6. Conclusions Part C.

Sapphire feel that, subject to the approval of the fire engineer, this demonstrates the StubGuard can provide a compliant level of protection of up to 120 minutes

PART D

1. Combustibility of materials.

Sapphire balconies are constructed from materials as below;

Component	Structure	Fixings	Coating	Other	Complies with ADB 7.2	Excluded within ADB 7.3
Arms/ Anchors	Steel	stainless steel/steel	Zinc		Yes	
Thermal break	Phenolic resin	N/A	N/A			Yes
Cassette	Aluminium	stainless steel.	N/A		Yes	
Connectors	steel/ aluminium	stainless steel.	N/A	Nylon/ Ceramic isolators	Yes	
Balustrade VB and panel	Aluminium	stainless steel.	PPC		Yes	
Balustrade laminated glass	Glass/PVB interlayer	Aluminium/stainless steel	N/A	rubber gaskets. Silicone sealant		See below.
Soffits and fascias	Aluminium	stainless steel.	PPC		Yes	
MyDek decking	Aluminium	Aluminium/stainless steel	PPC		Yes	

2. Laminated Toughened Glass.

There is much debate currently as to the use of laminated (toughened or heat strengthened) glass in balustrading, and a number of projects are currently on hold pending clarification.

2.1 Legislation

It may help to start with a brief review of recent legislation;

Amendments to AD Part B April 2019 – 7(2)
'Subject to paragraph (3), building work shall be carried out so that materials which become part of an external wall, or specified attachment, of a relevant building are of a European Classification A2-s1,d0 or A1 classified in accordance with BS EN 13501-1:2007+A1:2009 entitled 'Fire Classification of construction products and building elements.'

Amendments to AD Part B April 2019 – 12.14 d
'As per Regulation 7(3), window frames and glass (including laminated glass) are exempted from Regulation 7(2). Window spandrel panels and infill panels must comply with Regulation 7(2).'

BS EN 13501-1:2007+A1:2009 has been withdrawn and superseded **by BS EN 13501-1:2018 December 2018.** The introduction to this document (and the previous version) notes;
'The European Commission has drawn up a list of products which, under specified conditions, can be considered to be class A1 without testing. This information is given in the Commission Decision 96/603/EC (OJ L 267 19.10.1966 p23) as amended by 2000/605/EC (OJ L 258 12.10.2000 p36) and 2003/424/EC (OJ L 144 12.6.2003 p9)'

Commission Decision 96/603/EC (OJ L 267 19.10.1966 p23
The table noted within the 'Annex' notes
'Glass' as a material not requiring testing and considered as class A1. The adjacent notes state 'Includes heat strengthened, chemically toughened, ***laminated*** and wired glass'
Subsequent amendments to Commission Decision 96/603/EC (OJ L 267 19.10.1966 p23) i.e. 2000/605/EC (OJ L 258 12.10.2000 p36) and 2003/424/EC (OJ L 144 12.6.2003 p9)' do not appear to alter 'Glass' as a material considered as class A1.
Unfortunately, elsewhere in the same document, there is seemingly conflicting advice;

Panel products (e.g. of insulating material) with one or more organic layers, or products containing organic material which is not homogeneously distributed (with the exception of glue) are excluded from the list.

Products made by coating one of the following materials with an inorganic layer (e.g. coated metal products) may also be considered as ►M1 Class A1 and Class $A1_{FL}$ ◄ without testing.

None of the materials in the table is allowed to contain more than 1,0 % by weight or volume ►M1 (whichever is the more onerous) ◄ of homogeneously distributed organic material.

2.2 What is being done currently?

- The government department responsible, Ministry of Housing, Communities and Local Government (MHCLG) is aware of the uncertainty and on 28/6/19 commissioned PRP to conduct a preliminary study, and to draw views from industry bodies, manufacturers, developers, designers etc.. The results of this study, including our observations, were submitted on 5/8/19 and a response from MGCLG is awaited.

- Sapphire have had a meeting with a Government Minister and expressed our views. This has resulted in an official request for comment to the Minister of State for Housing on 9/7/19, and response is awaited. Our recommendations to MHCLG were as follows;

1. In regulation 7(2) omit 'European Classification A2-s1-d0 or Class A1, classified in accordance with BS EN 13501-1:2007+A1:2009' and add 'European Classification A2-s1-d0, A2fl or Class A1, classified in accordance with EN 13501-1:2007+A1:2009'
2. In regulation 7(3) add '(k) laminated glass in balustrades

- Sapphire has conducted a number of in-house flammability tests to establish the flammability of the interlayer. As can be seen below, after sustained application of flame, the interlayer does not ignite easily, and any droplets are contained. Following the results of these, we are now working with tier 1 contractors and fire and risk consultants in Manchester to carry out a further series of radiative heating and ignitability tests at Edinburgh University, with a view to getting together a cloud of data which will then allow us to consider some formal certification testing.

- The BS 8579 (balcony) committee debated the issue extensively on 15/7/19, and identified several points including;

  - this standard is for use throughout the UK and does not simply follow the precedent set against laminated glass for balconies in England;
  - glass for balconies, when acting as a guarding, is performing the same function as that of a full height window acting as the same, all component parts of which are exempted from Regulation 7(2) in England;
  - the guidance in the Commission Decision (and Glass for Europe) is contradictory and therefore clarification is needed;
  - the writing panel has found no evidence yet of laminated glass on a balcony leading to the spread of fire across a building or to another building;
  - glass has a place in the guardings of balconies as it can mitigate wind effects whilst at the same time allowing essential daylight into, and views out of, interior spaces;
  - where monolithic glass is used in guarding, the predominant industry opinion and evidence available is that the risks of injury and death from fragment impact after breakage are far higher than the safety risks associated with fire spread in laminated glass guardings;
  - the same standards should be set in terms of laminated glass for windows, doors, glazed spandrels, enclosed balcony weather screens, open balcony guardings and Juliet balconies regardless of whether the glass guarding is part of the window assembly or fixed to the opening reveals.

- Following this discussion, the BS 8579 committee drafted the following clause for insertion in the new standard to be produced shortly;

4.12.2 Materials and components for balconies in respect to fire

Components of balconies on buildings with an occupied floor over 18 m above lowest ground level and all buildings with stacked balconies should be constructed from materials achieving class A1 or $A2_{fl}$ for deck materials, and A1, or A2-s1, d0 for all other materials, as defined in BS EN 13501-1. All other buildings and other balcony arrangements should have risk of fire spread assessed and mitigated in the design. Certain components such as seals, gaskets, fixings, membranes, laminated glass and thermal breaks necessary to ensure other aspects of performance are achieved are exempt from this restriction.

2.3 Survey

Sapphire are currently conducting a simple survey via their website and social media and are monitoring and collating the results. This can be accessed via the link below.

https://sapphire.eu.com/industry-news/statement-recent-ban-on-laminated-glass/

The survey is ongoing, so no conclusions have been reached, but the overwhelming majority of responses to date have supported the use of laminated glass for balustrades.

3.0 Conclusions.

Sapphire feel that, based on the reasons set out herein, that laminated toughened glass balustrading (particularly as the exposed portion usually covers no more than 50% of the storey height of the building**)** does not significantly increase the risk of fire spread on a building which is otherwise formed from non-combustible material**,**
We are continuing to lobby MHCLG and work with industry representatives to get the legislation clarified.
It must stress however, that building owners and designers must make their own judgement as to the interpretation of the regulations, and the impact on their building design.

We hope you have found this guide useful and informative. Should you have any observations on the content or would like further details on this and other technical issues please contact a member of our technical team on 0844 88 00 553 or visit www.sapphire.eu.com

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