TECHNICAL GUIDANCE NOTE

Fire Risk Assessment of External Cladding Systems on High Rise Residential Building (Phase 3 Report)

Flats 101 – 1303 Iona Tower

33 Ross Way

London, E14 7GG

Commissioned by: A2Dominion Group

Report date: 30/03/2020 Report issue date: 03/04/2020

Building reference: 158930

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1. Introduction

The Ministry of Housing Communities and Local Government (MHCLG) has expressed concerns that some high rise residential buildings (HRRBs) throughout the UK may have been fitted with external cladding systems which do not meet the fire safety requirements as set out in the applicable National Fire Safety guidance (Approved document B Volume B (and more recently volume A) in England and Wales and Technical Handbooks section 2: Fire - domestic & non-domestic in Scotland).

In many cases, it has proven difficult to confirm whether the installed systems complied with the applicable guidance at the time of construction/installation, or had been subject to appropriate testing and approval regimes, because relevant historic documentation (such as that which would be included in Building Regulation 38 fire safety files in England and Wales, and the Fire Safety Design Strategy documents in Scotland) was not available or obtainable.

The MHCLG issued a consolidated Advice note on 20th January 2020, which superseded the twenty-two previously issued advice notes and incorporated and updated the advice on the assessment of non-ACM external wall systems (previously advice note 14)

To follow best practice and meet the requirements of the MHCLG consolidated advice note A2 Dominion made the decision to survey all buildings over 18m that are in their portfolio and under their control, with the objective of establishing:

1. What, if any, fire risks the buildings cladding systems present to the occupants.
2. What remedial actions might be required to manage the risks in the shorter term and eliminate them in the longer term.
3. The appropriate documentation of the installed systems, to form the start of a comprehensive fire safety file for each building.

2. Routes to Compliance

There are three routes to compliance which can be adopted during the design phase of a cladding system that is to be applied to a tall building (i.e. a building which under the current guidance is in excess of 18 metres in England and Wales and 11 metres in Scotland, from the upper floor surface of the highest habitable floor, to the ground level on the lowest side of the building).

2.1 The Linear Route

A linear route to compliance is set out in the applicable National Fire Safety Guidance. For existing buildings in England and Wales, National guidance requires the insulation to be of limited combustibility (B-s3,d0 Euroclass) or non-combustible (A2-s1,d0 Euroclass) and non-combustible (A2-s1,d0 Euroclass) in Scotland.

An amendment to Building Regulation 7 requires all components of external wall systems and specified attachments for all new residential buildings and residential buildings undergoing building works in England and Wales, to be non-combustible (Class A1 or A2-s1,d0)

This is defined as materials which are ‘listed’, or which have met the required performance criteria, after having been subjected to specific small-scale fire tests.

There are separate requirements relating to the surface spread of flame for the external surfaces of the façade. These are relative to the building height, its use, and boundary distances and should be Class 0/Low Risk/Euroclass B-s3d2 or better, regardless of whether the insulation is of limited combustibility or is non-combustible.

2.2 Performance-Based Route

To demonstrate compliance via a performance-based route, the complete façade system is tested in a large-scale fire test (BS 8414 part 1 or part 2 as is applicable to the cladding system under test). Façade systems which pass the BS 8414 test are listed in the BRE 135 classification listings.

2.3 The Fire-Engineered Route

In the majority of situations regarding external cladding systems, a fire engineered route to compliance requires an appraisal of the fire risks that are presented by the building design, its use and occupancy type, the individual components and materials and the components used in the cladding system.

This approach, which must be undertaken by a competent Fire Engineer, is currently not accepted by the approving authorities.

3. The Appraisal Process

A2 Dominion has instigated a programme of building surveys, taking into account the experiences and lessons learned in the field.

Initially, the buildings identified as being ‘tall buildings’ with cladding are surveyed to confirm that external cladding was present, to photograph the exterior of the building, and to confirm that access for hydraulic platforms or other access equipment was possible.

A Phase 1 report was then produced, which included all this information, as well as any additional information on the cladding system design and installation that was available. This process eliminated a number of buildings from the need for any further investigation.

The completed Phase 1 report (see Appendix A) was then submitted to Metro SRM in order that the photographs of the building elevations could be marked to show the recommended locations of façade openings. The location of the openings is intended to enable the surveyors to gain access to, and to compile information on, both the cladding systems and the installed fire barriers.

The annotated Phase 1 photographs were returned to the A2 Dominion survey team with an accompanying Phase 2 report template, and a copy of Metro SRM’s Surveyors Guidance Notes (see Appendix B).

The completed Phase 2 report (see Appendix C) was returned to Metro SRM for appraisal and recommendations for next steps.

This Phase 3 summary report is the result of the information that has been gathered on the cladding system installed to the buildings named in the title page.

4. Comments Arising and Recommendations

The comments and recommendations set out in this Phase 3 report are based on the information gathered in the Phase 1 and 2 reports. Any additional information that has been provided and considered is itemised below.

4.1 Additional Information Provided or Considered

No additional information, other than the guidance in Approved Document B, was provided or taken into account in the compilation of this Phase 3 report.

4.2 External cladding

The type of external cladding at Iona Tower is a lightweight composite material, which is riveted to a metal frame with a build-up of phenolic foam and cementitious board with cavities between to the concrete structure behind. At ground and part first floor levels a brick skin is provided.

The building comprises thirteen storeys and is over 30m tall measured from ground level to the topmost floor slab. It is understood that sprinklers are provided to the building. Current Building Regulations require buildings of this height to be sprinklered.

The external cladding is expected to provide a rating of Class 0 finish.

4.3 Insulation

The insulation provided to the building is understood to be a phenolic foam board with a cementitious board behind it within the layers of the external wall build-up. This material is permitted in buildings of this height when installed to the tested detail from a BS 8414 test and in accordance with BR 135.

4.4 Fire Barriers

Fire barriers are required in accordance with Section 9 of ADB. Where compartment floors and walls are provided, the cavity barriers are necessary to prevent spread of smoke and flame and should sub-divide the cavities which could otherwise form a pathway around fire-separating elements.

Extensive cavities are addressed by Sections 9.8-9.10 in ADB and in Table 13. 9.10(d) states that the provisions do not apply to any cavity formed behind the external skin of an external cladding system with a masonry or concrete inner leaf at least 75mm thick…..provided that the cavity does not contain combustible insulation and that the building is not put to a residential or institutional use; neither of these clauses apply in this case.

Approved document B also states that any cavity barriers provided should be fixed so that their performance is unlikely to be rendered ineffective by a failure in fire of any material or construction that they abut.

Cavity barriers should be provided in accordance with Diagram 33 overleaf.

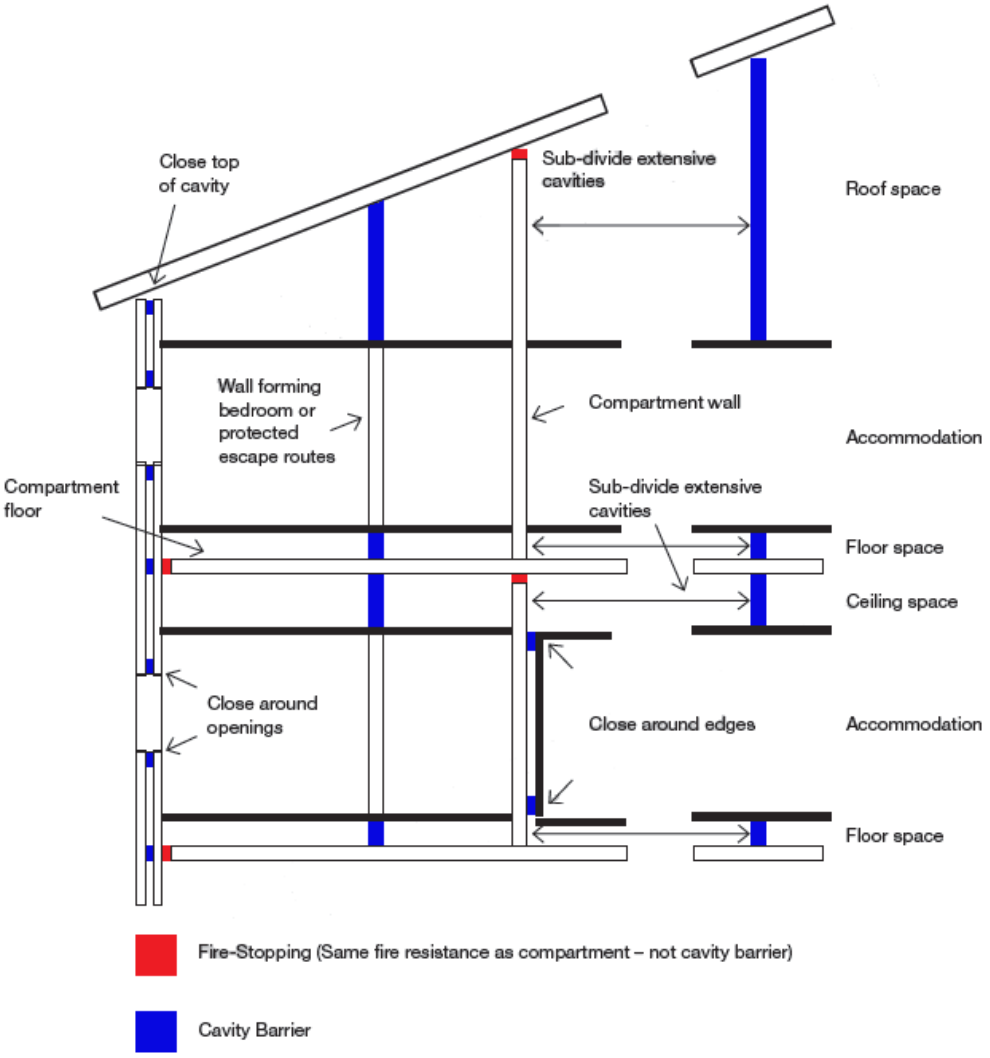


Figure 4.1 Provisions for Cavity Barriers

A fire barrier was observed between flats where opening up works were carried out, however, the barrier did not extend out through the phenolic foam insulation as provided in the tested detail, nor did it appear to have a cavity closer (e.g. intumescent strip) to close the gap behind the insulation as in the design detail. This requires further opening up to confirm whether a barrier has been provided separating the insulation and providing a means to close the cavity at compartment floor level, and vertically between flats on any of the floors in this building. If a number of sample locations show the same deficiency, all cavity barrier locations will need to be opened up.

The build-up described in the Phase 2 report (Appendix B). This is not consistent with the guidance provided in Approved Document B, since it may render the cavity barrier ineffective by allowing flame to pass around the barrier to the next compartment and beyond, rendering the fire strategy for the building ineffective.

The design detail includes a 20mm cavity with an intumescent strip on the profile to close the cavity behind the cavity barrier. These were not found in all locations where the opening up works were undertaken.

4.5 General comments

From the opening-up works undertaken in the Phase 2 survey at Iona Tower, it would appear that there are a number of non-conformances with the as-built construction compared to the requirements of Approved Document B to the building Regulations.

Cavity barriers were not found to extend out through the insulation as in the tested detail. Gaps behind the insulation did not appear to have intumescent strips provided to close the gap in case of fire.

Should a fire occur, there is a route past the cavity barriers allowing fire spread between flats. It is, therefore, considered that the system as installed does not comply with either B3 – cavity barrier requirements or B4 – external fire spread.

4.6 Recommendations

Although non-compliant, provided that sprinklers have been provided to the building and are tested and maintained, it should not be necessary to re-house the residents nor undertake a fire watch. It is considered prudent to provide an interlinked detection system (heat detector and sounders in all flats) to enable simultaneous evacuation as an interim measure, until the extent of the deficiency can be determined and rectified.

Further intrusive works should be undertaken to open up all areas where cavity barriers would be expected and a remedial program put in place to address all deficiencies, such that the building meets the requirements of the Building Regulations.

No combustible materials should bridge the cavity barriers, cavity barriers within the rainscreen should have the ability to close the cavity, therefore, all barrier locations should be checked to ensure compliance and that the appropriate level of fire resistance is afforded to the building.

Short-term measures: Provide an interlinked detection system to all flats, comprising heat detectors and sounders and call points at storey exits and in corridors longer than 30m.

Medium term measures: Provide appropriate cavity barriers to all locations where compartment walls and floors are present and around openings such as windows and doors.

Long term measures: None.

Appendix 4.6 A. External Wall Hazard Appraisal tool

In grading the potential fire safety risks presented by the various hazards which are directly and indirectly related to the external wall system, a subjective appraisal must been made of the salient factors which include, but are not necessarily limited to:

- The prevailing circumstances in the building.
- The building's occupancy type.
- The design criteria and maintenance arrangements for the cladding system.
- The fire resisting qualities and the condition and serviceability of the materials and components which make up the cladding system.

The risks arising from each hazard type in relation to, unrestricted fire spread and the life safety risks to occupants and relevant persons, have been appraised in isolation to other risks that may be present, and assessed as trivial, moderate, substantial or intolerable, and assigned an indicative numeric score on the following basis:

Trivial: No matters of concern relating to design, materials, workmanship or building management identified.
Moderate: Isolated and relatively minor faults and errors, relating to either the design, materials, workmanship or building management have been identified.
Substantial: Potentially significant faults or errors, or multiple examples of relatively minor faults and errors, relating to the design, materials or workmanship or building management have been identified.
Intolerable: Significant faults, or multiple examples of significant faults and errors relating either the design, materials or workmanship have been identified.

The combined hazard values for the building, the external wall and the EWS attachments have been assigned an overall numeric value where:
6 = Negligible risk. 9 – 12 = Moderate risk . 15+ = Intolerable risk .
Negligible / tolerable: Presents no significant risk. Current arrangements need to be maintained periodic reviews and inspections are required to ensure no deterioration in arrangements. May require minor remedial works during future upgrades or refurbishments.
Significant: Presents specific risks which, in the short to medium term, are manageable. Will require the implementation of significant interim remedial actions which may include decanting of residents with special needs or who reside in specific parts of the building.
Intolerable: Presents significant risks which are likely to be difficult or impossible to manage. Where managed, interim risk reduction measures are considered feasible, they are likely to likely to require the decanting of some, or in the worst cases, all residents.

Building hazard value

Establish a score of 0, 3, 5 or 15 for each hazard type.

Score→ Hazard type ↓	0	3	5	15
Height	< 11 metres	11/18 metres	>18 metres	
Occupancy risk	Normal	Higher	Disabled / vulnerable	
Means of escape	Two or more protected stairs. Alternative protected escape routes. Compliant travel distances.	Two stairs either of which has dubious protection or adjacent cladding. Extended travel distances. Engineered or managed solutions.	Single stair. Escape via neighbouring demise.	CoP3 designs.
Building fire safety management. As assessed in a suitable & sufficient fire risk assessment carried out under article 9 of the fire safety order 2005.	Overall risk rating of trivial or tolerable.	Overall risk rating of moderate	Overall risk rating of substantial	Overall risk rating of intolerable
NOTE: The perceived hazards and associated risk levels are subjective. The examples in the above columns are not exhaustive and are provided only as indicators of the contributory factors that might be considered			A score of 5 or more indicates an urgent need to reduce the fire risks in the day-to-day operation of the building. Failure to do so might raise the overall risk to intolerable.	

The combined score for building hazard = 3 where:

0 – 6 = Negligible / tolerable. 9 – 12 = Significant. 15+ = Intolerable.

External wall hazard value

Establish a score of 0, 3, 5 or 15 for each hazard type.

Score→ Hazard type ↓	0	3	5	15
Whole system	BR135 listed			
Cladding	Non-combustible and correctly installed	Minor installation errors.	Limited combustibility. Treated timber.	Combustible. Non-treated timber. Significant installation errors
Insulation	Non-combustible and correctly installed.	Minor installation errors.	Limited combustibility.	Combustible. Significant installation errors
Fire barrier	Correctly located and installed.	Minor installation errors.		Missing. Significant installation errors
Ancillary components	Non-combustible and correctly installed.	Limited combustibility. Minor installation errors.	Significant installation errors	Combustible.
Windows	Suitably certified or marked. Steel frame.	Plastic. Timber.		
Spandrel panels	Suitably certified or marked.	Un-certified or unmarked cementitious or inorganic fire resisting material.	Unmarked / uncertified HPL.	Plastic. Timber.
NOTE: The perceived hazards and associated risk levels are subjective. The examples in the above columns are not exhaustive and are provided only as indicators of the contributory factors that might be considered.				

The combined score for building hazard = 11 where:

3 –9 = Negligible / tolerable. 10 – 12 = Moderate. 15+ = Intolerable.

EWS attachments hazard value

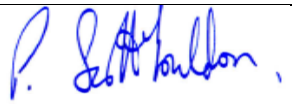
Establish a score of 0, 3 or 15 for each hazard type.

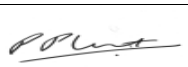
Score→ Hazard type ↓	0 Trivial	3 Moderate	15 Intolerable
Balconies	Not present. No combustible construction, components and materials.	Construction and /or components of limited combustibility.	Combustible construction, components or materials. Timber components without non-combustible substrate.
Heat source panels, solar panels and similar.	Not present. Non-combustible and correctly installed	Limited combustibility. Minor installation errors. Located remote from fenestrations and ignition sources.	Combustible. Significant installation errors.
Decorative attachments.	Not present. Non-combustible.	Limited combustibility. Located remote from fenestrations and ignition sources. Small in size and area.	Combustible. Significant installation errors
	NOTE: The perceived hazards and associated risk levels are subjective. The examples in the above columns are not exhaustive and are provided only as indicators of the contributory factors that might be considered.		

The combined score for building hazard = 5 where:

3= Negligible / tolerable. 6 – 8 = Moderate 9 - 15 = Intolerable.

5. Report Completion

Report Author	Signature	Date
Pat Scott-Youldon B.Eng (Hons) Fire Safety Engineering		30/03/2020

Report Checked By	Signature	Date
Phil Plant MIFSM, MIFiREBSc (Hons) MIFSM		03/04/2020

Appendix A: Phase 1 Report

Please see attachments.

Appendix B: Annotated Phase 1 Photographs

Please see attachments.

Appendix C: Phase 2 Report

Please see attachments.