TECHNICAL GUIDANCE NOTE

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

Coral Apartments
6 Salton Square
London E14 7GL

Commissioned by: A2Dominion Group

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Building reference: 160130 – G01-612 – Coral Apartments

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The MHCLG issued a consolidated Advice Note on 20th January 2020, which superseded the twenty-two previously published Advice Notes and incorporated and updated the advice on the assessment of non-ACM external wall systems (formerly Advice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

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

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 over 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

In order 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 applies 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 verify 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 so 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 and relevant recommendations in the MHCLG consolidated advice note, was provided or considered in the compilation of this Phase 3 report.

The premises, Coral Apartments, is a seven-storey building, being approximately 23m tall to the uppermost floor slab, with residential use on all floors.

4.2 External Cladding

The building is largely constructed from reinforced concrete with a brick envelope, with substantial areas of insulated render. The upper floor has coated aluminium cladding over insulation outside of the concrete structure. Insulated spandrel panels are present between windows in a number of locations.

4.3 Insulation

The insulation behind the metal panels is a polyisocyanurate (PIR) foam board (Kingspan Kooltherm) with mineral or glass wool quilt behind.

The insulation behind the rendered areas is expanded polystyrene.

The spandrel panels contain a man-made foam core, thought to be polyisocyanurate (PIR) foam.

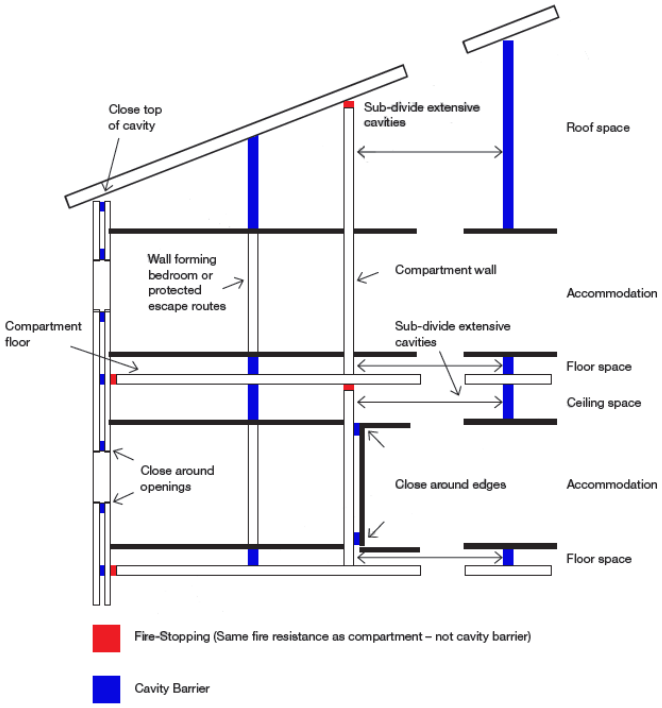
Insulation found behind the spandrel panels was a mineral/glass wool quilt.

4.4 Fire Barriers

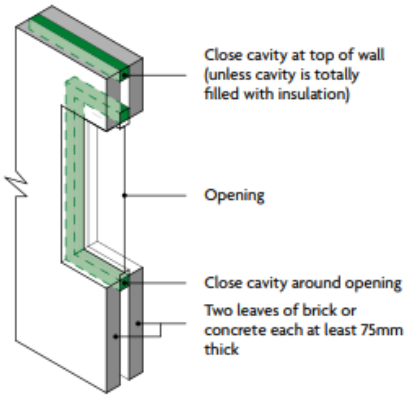
Fire barriers are required in accordance with Section 9 of ADB. Where compartment floors and walls are provided, the cavity barriers are necessary to prevent the spread of smoke and flame and should sub-divide the cavities which could otherwise form a pathway around fire-separating elements.

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 the event of fire of any material or construction that they abut.

Cavity barriers should be provided in accordance with Diagram 33 of Approved Document B (see below).



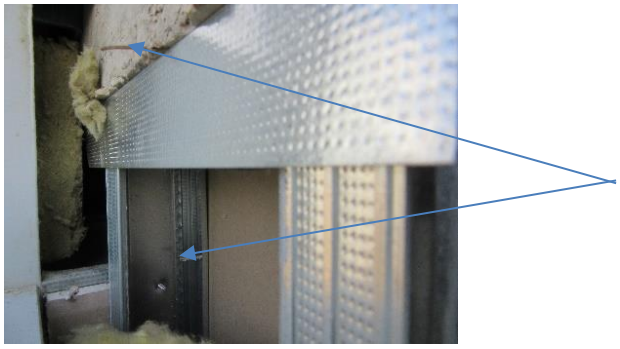
4.5 Provisions for Cavity Barriers



Cavity barriers were found at horizontal levels and at vertical compartment walls in the insulated render system cavity. Cavity barriers were not seen around openings as required (see diagram above), although this is unlikely to have been a specific requirement of the manufacturer's guidance at the time of construction.

However, the barriers are not full thickness since the polystyrene is 120mm deep and the cavity barrier 100mm, leaving a 20mm gap to the rear of the barrier through which hot gasses and flame could pass to the next compartment.

Cavity barriers were also found behind the coated metal panels where insulation is fitted. These barriers are required on a horizontal plane between floors, on vertical planes separating different flats, and around windows.



The vertical barrier was removed in the lower part of the righthand picture above to reveal the board behind.

4.6 General Comments

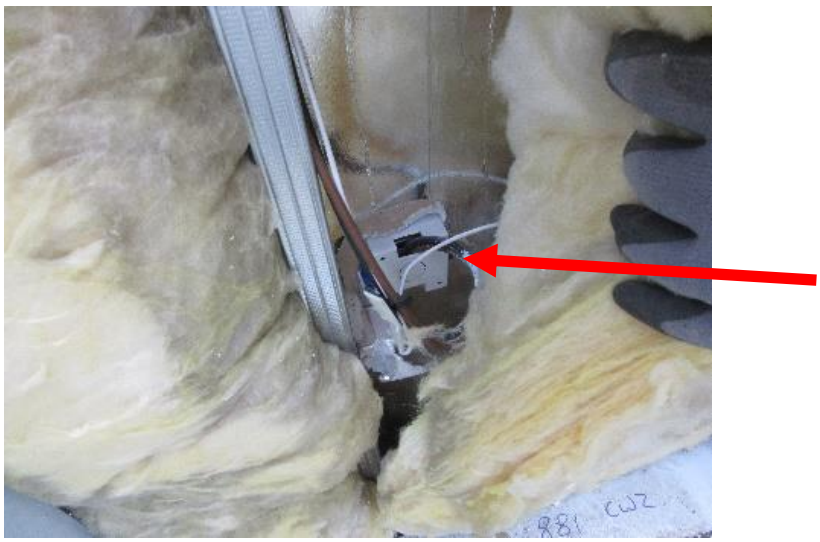
The majority of the external envelope of the front of the building is formed from a masonry cavity wall. Within the external wall build-up, combustible insulation is present which does not conform to the latest MHCLG guidance, however, it did comply with the guidance in Approved Document B at the time of construction.

At the rear of the premises, the majority of the external envelope is a rendered EPS which, although cavity barriers are present at horizontal and vertical compartment lines, is not a limited-combustibility material and does not comply with guidance. It may have been considered to comply with the Building Regulations at the time it was registered, depending on whether this was pre-2010. However, the building is believed to be eight years old; if this building was registered post-2010 then the use of EPS over 18m does not comply with ADB or MHCLG guidance.

The use of PIR foam in the spandrel panels is also non-compliant. These would meet the Class 0 requirement under the 2010 guidance but not the limited combustibility requirement for a building over 18m.

The PIR foam insulation provided behind the metal cladding would have met the requirements of the Building Regulations at the time of construction, and there are BR 135 approved systems where PIR insulation is acceptable in conjunction with aluminium cassette panels and plasterboard on a steel frame.

It was also noted during the intrusive survey that the wallboard forming the inner skin of the external envelope had been cut away to fit plastic socket boxes (TV aerial box shown in the picture below). These do not appear to have been fire stopped with either putty pads or fire-resisting back boxes. This could allow a fire within a flat to pass through the fire-resisting construction and involve the flammable insulation.



4.7 Recommendations

Based on the hazard appraisal tool (see section 5):

4.7.1 Immediate risk reduction measures

Provide putty pads or fire-resisting back boxes to plastic socket boxes and tv aerial boxes that penetrate the wallboard in the external envelope.

4.7.2 Medium-term risk reduction measures

Provide cavity barriers to all windows.

Replace combustible EPS (expanded polystyrene) with material meeting the Euroclass A2 requirements, or upgrade system to one which is BS 8414 tested & BR 135 approved.

Government guidance stipulates that when substantial works are carried out, materials are replaced with those meeting the A1/A2 standard or have passed BS8414 test successfully.

It is not considered necessary to replace the metal cladding and insulation since there are tested BR 135 build-ups for these materials. Although the mineral wool layer is not present in the tested detail, since this is non-combustible, as is the wall board behind it, it is unlikely to affect the performance of the system.

4.6.3 Long-term risk reduction measures

None.

5. 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 be 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 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 = 12 where:
3-9 = Negligible/Tolerable
10-12 = Moderate
15+ = Intolerable

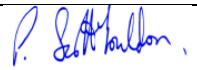
EWS Attachments Hazard Value

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 = 3 where:
3 = Negligible/Tolerable
6-8 = Moderate
9-15 = Intolerable

6. Report Completion

Report Author	Signature	Date
Pat Scott-Youldon B.Eng (Hons) Fire Safety Engineering		28/02/2020

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.