

ASSESSMENT OF CLADDING DETAIL



Assessment of External Cladding Systems for:

Gemini,
Park Manor Way,
Borehamwood,
Hertfordshire WD6

Commissioned by: Wayne Mardell, SHW
Report date: 23rd March 2020

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Introduction

The requirements of the Building Regulations apply to its design, refurbishment or alteration of a building, whereas the Regulatory Reform (Fire Safety) Order applies to the use and current risks within a building.

When undertaking a fire risk assessment of a building or part thereof, account should be taken of the external façade of the building and the possibility for fire spread. For most fire risk assessments, this will be a visual inspection only, unless an invasive (Type 4) assessment is being carried out. The as-built details, which should be provided as part of the Operational & Maintenance Manuals (O&Ms), are rarely available in full for any given premises.

This report re-iterates the legislative and technical requirements and analyses the results of the intrusive survey in terms of compliance.

The intrusive survey at Gemini was undertaken on 3rd March 2020 in several locations on different floor levels around the façade of the building. The results are detailed at the end of this report.

Legislative requirements

The relevant functional requirements of the Building Regulation are:

B4. (1) The external walls of the building shall adequately resist the spread of fire over the walls and from one building to another, having regard to the height, use and position of the building.

Where the building height exceeds 18m, Section 12 of Approved Document B2 gives guidance on the acceptable use of combustible materials within the external cladding system. ADB recommends either the use of **materials of limited combustibility** for all key components, including **insulation products and filler materials** (not including gaskets, sealants and similar) etc.; or to submit evidence that the complete proposed external cladding system has been assessed according to the acceptance criteria in BR135 - Fire Performance of External Thermal Insulation for Walls of Multi-storey Buildings.

This was superseded in December 2018 by the requirements of the Building (Amendment) Regulations, which state:

- 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 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. Classification using test data from reaction to fire tests” (ISBN 978 0 580 59861 6) published by the British Standards Institution on 30th March 2007 and amended in November

It is worth noting that the only recognised classification is the European classification. The older British Standard classification, which was recognised in previous guidance, is not included in the new Regulation.

BS EN 13501-1 defines the classes A1 and A2 as follows:

Class A1 Will not contribute in any stage of the fire, including the fully developed fire. Class A2 Will not significantly contribute to the fire load and the fire growth in a fully developed fire.

When the premises were constructed, the following diagram in ADB applied:

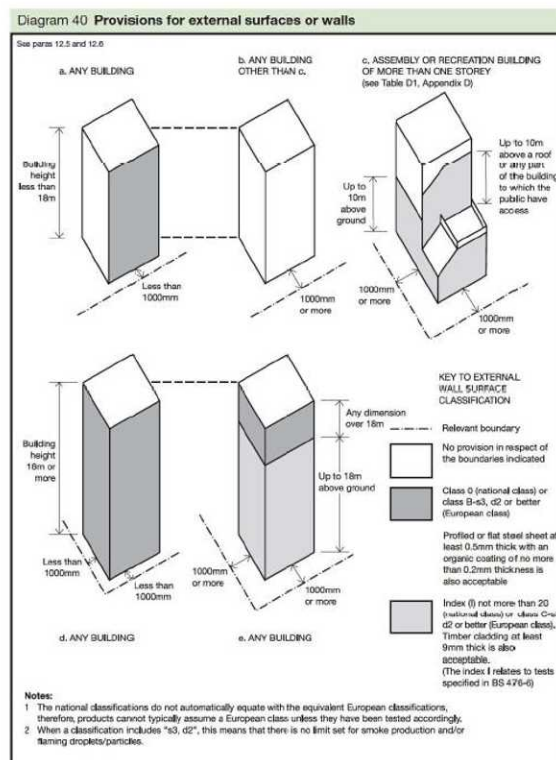


Figure 1 Diagram 40 ADB

Building Control Alliance (BCA) Guidance

With the aim of addressing common misconceptions regarding the use of combustible materials within the façade system of residential buildings containing a storey 18 metres or greater above ground level, the industry group BCA, operating in England and Wales, issued its Technical Guidance Note 18: Use of Combustible Cladding Materials on Residential Buildings.

Whilst the note reiterates the guidance given in Approved Document B Volume 2 (England) for the Fire Safety Engineering route, it also expands upon the guidance given for the linear and performance-based routes and in addition, categorises each method into 'Options'.

The guidance given for the linear route differs in that it explicitly states that for the entire façade area, both above and below 18 metres, all major elements comprising the façade system, including the internal lining board and the external facing material, should be of limited combustibility.

Note 18 advises that the preferred method of demonstrating compliance is to submit evidence to the Approval Authorities, showing that the complete proposed façade system has been assessed in accordance with the acceptance criteria (i.e. external fire spread, internal fire spread and mechanical performance), set out in BR 135, using data from large scale tests carried out by an independent United Kingdom Accreditation Service (UKAS) accredited testing body, to BS 8414-1: 2015 (amended 2017) and BS 8414-2: 2015.

Routes to Compliance

Previously there were three routes to compliance with the fire safety requirements of the Building Regulations regarding the insulation in façades on buildings with a habitable storey 18 metres or greater above ground level:

Linear Route

Firstly, a linear route to compliance is offered by the technical guidance given in Approved Documents B Volume 2: Fire Safety – Buildings other than Dwellinghouses (separate editions for England and Wales), and Technical Handbooks Section 2: Fire – Domestic & Non-domestic (Scotland).

This route requires the insulation to be of limited combustibility (England & Wales) or non-combustible (Scotland), which, in this context, is defined by being a material that either is 'listed' or

has met the required performance criteria after having been subjected to specific small-scale fire tests. Unlike in large scale fire tests, for this case, testing is performed on the insulation in isolation from all other materials comprising the façade system. As such, material performance determined via this route is not wholly representative of that for the complete system build-up.

Aside from the classification of the insulation in terms of combustibility, there are separate provisions for the external surfaces of the façade system in relation to the building height, use and boundary. For instance, where the boundary of a building is no greater than one metre, the façade should be Class 0 / Low Risk / Euroclass B-s3d2 or better, regardless of whether the insulation is of limited combustibility or non-combustible.

(NB ADB Volume 1 refers to ADB Volume 2 for supplementary guidance in relation to unusual or very large buildings i.e. those greater than 18 metres in height. There are single dwellings of 6-7 storeys and more still being built, or older Villas being converted back from apartments to which this would apply.)

Performance-based Route

Secondly, a performance-based route is offered. The guidance requires that the complete façade build-up meets the acceptance criteria set out in BR 135 (Fire performance of external thermal insulation for walls of multi-storey buildings), using large scale test data from: BS 8414-1: 2015 (Amended 2017) (Fire performance of external cladding systems. Test methods for non-loadbearing external cladding systems applied to the face of a building); or BS 8414-2: 2015 (Fire performance of external cladding systems: Test method for non-loadbearing external cladding systems fixed to and supported by a structural steel frame).

Fire Safety Engineering Route

This route is no longer available.

Since the publication of the BCA guidance, the Government has published further guidance regarding the make up and combustibility of the external envelope of buildings. A number of Advice Notes have been issued, the most relevant of these is Advice Note 14. This note states:

Independent Expert Advisory Panel advice

- Building owners are responsible for the safety of their buildings.
- Building owners or their appointed competent professional advisors(s) should check that the external wall systems on their buildings are safe.
- **For existing buildings this means only materials that are of limited combustibility (class A2 or higher) should have been used, unless the system has achieved BR135 classification via a BS 8414 test.**
- The owner or their appointed competent professional advisors(s) should ensure that the system has been installed and maintained appropriately.

Since the height to the top floor slab is over 18m, the requirement at the time that the building was constructed was to achieve B s3 d2. Both of these are lesser standards than the current Government advice that the external cladding should achieve at least A2 s1 d0. Since the external cladding is non-combustible the materials used in the external build-up meet current guidance.

Protection of Openings and Fire Stopping

All penetrations through fire separating elements should be adequately fire stopped or sealed to ensure that the integrity and performance of the element is not impaired. Areas that will require fire stopping will be around pipe and cable services, ventilation ducts and flues and junctions between fire separating elements.

All elements and services that penetrate a compartment wall, floor or other element of fire resisting construction are to be fire stopped using a method appropriate to element penetrated and the surrounding construction.

Typical fire stopping materials include:

- Cement mortar
- Gypsum-based plaster
- Cement-based or gypsum-based vermiculite/perlite mixes

- Glass fibre, crushed rock, blast furnace slag or ceramic-based products (with or without resin binders) and
- Intumescent mastics.

Systems used must be designed, installed, tested and maintained in full accordance with the relevant BS 476 standard and the ASFP Approved Code of Practice.

Any ventilation ductwork will also need to be fire protected where it penetrates a fire separating element. Since ventilation ducts provide a potential route for fire spread through the duct, consideration of how this will be fire stopped must also be made. Three basic methods should be considered:

- Protection using fire dampers;
- Protection using fire resisting enclosures;
- Protection using fire resisting ductwork.

Where a ventilation duct serves more than one part of a compartmented or fire separated protected escape route, smoke detector operated fire dampers should be provided where ductwork enters each fire separated or smoke separated section of the escape route.

Concealed spaces

Concealed spaces and cavities in the building can allow the rapid unseen spread of fire and smoke to areas remote from the seat of an incident.

If concealed spaces or cavities are created, cavity barriers will be required. The cavity barriers must provide a minimum of 30/15 minutes' fire resistance period in term of integrity and insulation respectively.

Cavity barriers must be securely supported so as to guarantee integrity and insulations properties irrespective of the failure of un-rated components.

In accordance with ADB, cavity barriers should be provided in the external envelope as follows:

- All junctions between an external cavity wall and every compartment floor and compartment wall;
- All junctions between an internal cavity wall and every compartment floor, compartment wall, or other wall or door assembly which forms a fire-resisting barrier;

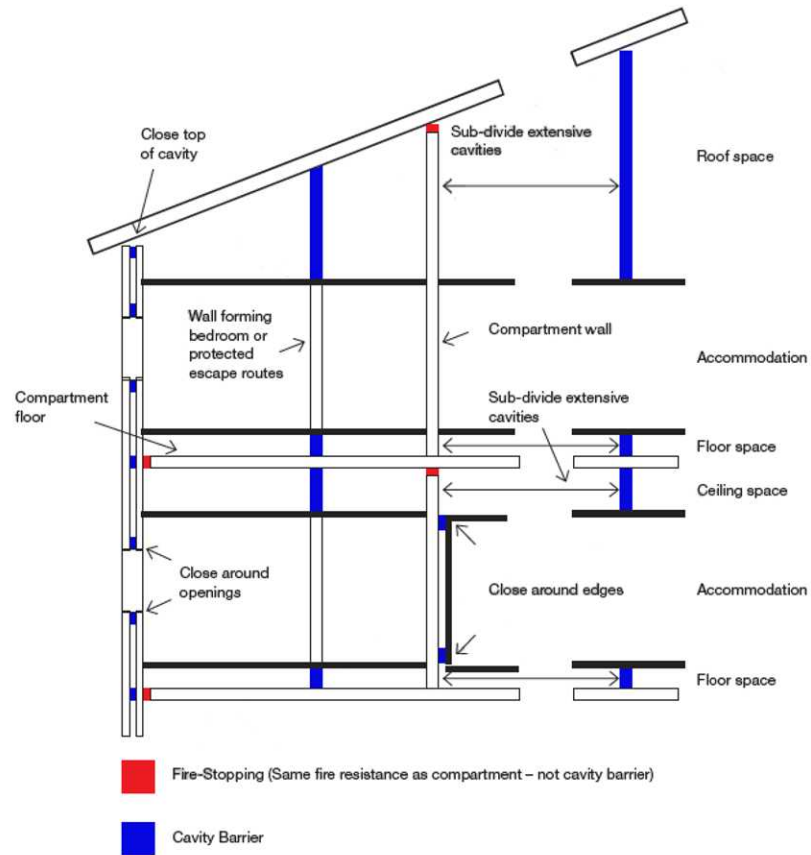


Figure 1 – cavity barrier provision

This includes external cavities and around openings such as windows and doors.



Figure 2 – Illustration of provision of cavity barriers behind cladding including around window and door openings.

Intrusive Survey Findings

Cladding build-up

The building is a seven-storey modern building with a semi-enclosed car park underneath. The main part of the building is constructed from a variety of materials, mainly rendered masonry, brick and some zinc cladding.

The majority of the external skin of the building is formed from solid masonry. The majority is rendered with areas of exposed brickwork. Small areas of the top floor and the staircase enclosures have zinc cladding provided, fixed to a metal rail system which in turn is fixed to solid masonry.



The requirement within the amended Building Regulations and Government guidance (MHCLG Advice notes) for a minimum of A2 combustibility applies to buildings over 18m.

Cavity Barriers

The brickwork was opened up exposing the insulation within the cavity. The insulation was noted to be mineral wool. Plastic wrapped cavity barriers were also noted to be present. These are an overprovision since the inner skin is blockwork. Where blockwork cavities are present, the compartment line extends to the inside of the inner skin.



Brick, blockwork and zinc cladding and mineral wool are non-combustible (A1).

At the base of the building the cavity was noted to be open and cavity barriers visible. In one location an opening was present which requires fire stopping.



Balconies

Steel framed balconies are provided to the premises, with timber decking materials. No combustible timber decking should be present on these balconies to be compliant with MHCLG guidance and clarification regarding the requirements under B4 (Approved Document B) to limit spread of fire externally to the building.

Conclusions

The building at Gemini Park is generally in accordance with the guidance to the Building Regulations (Approved Document B) and in accordance with the latest Government Guidance in respect of the build up of the external envelope, however, one opening in the cavity requires fire stopping.

Balconies require replacement of the timber decking present with a material which achieves Euroclass A2 or better e.g. aluminium decking, or the balconies fire separated from underneath with non-combustible material.

Competence of Consultants

Tennyson Suite Limited is a Chartered Building Consultancy and is accredited to ISO 9001; OHSAS 18001; and BS EN ISO 14001 to provide specialist health and safety advice on the following: CDM advisers to clients, designers, principal designers, principal contractors and contractors, principal designer duties, construction phase health and safety plans, risk assessments including fire risk assessments and method statements, health and safety policies, design and delivery of training programmes for the construction industry and wider commercial applications.

Bibliography

1. Building Regulations 2010 Part B "Fire Safety" Approved Document B (2006 Edition) incorporating 2007, 2010 and further 2013 amendments
2. British Standard BS 476: Fire Test on Building materials and Structures
3. BS8414-1:2015+A1:2017. Fire performance of external cladding systems. Test methods for non-loadbearing external cladding systems applied to the masonry face of a building.
4. BRE Report 135. Fire performance of external thermal insulation for walls of multi-storey buildings".
5. MHCLG Advice Note 14 Advice on external wall systems that do not incorporate Aluminum Composite Material.
6. MHCLG Advice Note 21 Advice for Building Owners of Multi-storey, Multi-occupied Residential Buildings.