LABSS INFORMATION PAPER INFOP32 - 2021 Version 2 – 28 October 2021

Building (Scotland) Regulations 2004
Sections 2 Fire, Section 3 Environment, Section 6 Energy

What type of cavity barriers are required and where should they be installed?

QUESTION: Can open state (intumescent) cavity barriers be used in any and every location as prescribed in guidance to the Mandatory Standards under Section 2 Fire?

BACKGROUND:
SECTION 2 FIRE:
This question impacts on Section 2 Fire in terms of Mandatory Standards 2.1 Junctions in compartment walls/floors, 2.2 Junctions in separating walls/floors, 2.4 Cavity protection in external wall, floor and wall elements, 2.6 Fire spread to neighbouring properties, 2.7 External wall cladding and 2.9 Escape.

SECTION 3 ENVIRONMENT:
Any consideration of where and what type of cavity barriers should be installed must also take due cognisance of the guidance contained in Section 3 Environment when considering Mandatory Standards 3.10 Precipitation and to an extent 3.15 Condensation risk.

SECTION 6 ENERGY:
Any consideration of where and what type of cavity barriers should be installed must also take due cognisance of the guidance contained in Section 6 Energy when considering the likelihood of cold bridging through and element. Non-repeating thermal bridging at the junctions of building elements and around openings in the building envelope form part of the calculation of energy performance.

MODERN METHODS OF CONSTRUCTION: Volumetric and Panelised Constructions
Given the potential increase in the use of off-site externally constructed factory constructed elements, either in relation to volumetric units (comprising complete buildings or parts of buildings) or in the off-site construction of wall, floor and roof elements for timber kits etc, the installation of correctly installed cavity barriers and fire stopping is crucial in achieving compliance.

PERFORMANCE OF BARRIER:
The design of cavity barriers must always be mindful of the need for the more onerous guidance in respect of fire-stopping when considering junctions between compartment and separating wall, floor and roof elements where the fire resistance needs are such that the barrier resistance must equal that of the wall, floor or roof element. LABSS have already considered this and advice has been circulated to all verifiers.

Other areas of compliance checks include the correct use and installation of cavity barriers. For example, are some barriers suitable for use only in a horizontal location or only a vertical location.

Section 2 Fire prescribes a need to restrict the spread of smoke and fire. There has been a recognition in more recent times that the spread of cold smoke is not such an issue and indeed guidance under Clause 2.4.1 Cavity barriers to both the Domestic and Non-Domestic Technical Handbooks emphasises this when referring to the use of open state cavity barriers. It is clear that the use of open state barriers in external walls wherever there is a prescribed need under Standards 2.1, 2.2. 2.4, 2.6, 2.7 or 2.9 is now a recognised method of meeting these Mandatory Standards.

In every case there is a need for whatever barrier is used to meet certain fire related performance levels.

- For barriers installed under Mandatory Standard 2.4 Cavity barriers where they are NOT in association with a compartment or separating element as defined by Standards 2.1, 2.2 or in association with the protection of an escape route as defined in Standard 2.9 then the barrier must provide a protection level

of **30 mins for integrity only** from the underside for horizontal barriers and from both sides for vertical barriers.

- For barriers installed under Mandatory Standards 2.1 Junctions in compartment walls/floors, 2.2 Junctions in separating walls/floors, 2.6 Fire spread to neighbouring properties, 2.7 External wall cladding and 2.9 Escape the barrier must provide a protection level as follows:
  - Compartment floor, separating floor or a floor, flat roof or access deck protecting routes of escape (see clause 2.0.6)
    - **Short** duration – **30 mins for load-bearing capacity, integrity, and insulation** – from the underside
    - **Medium** duration – **60 mins for load-bearing capacity, integrity, and insulation** – from the underside
    - **Long** duration – **120 mins for load-bearing capacity, integrity, and insulation** – from the underside

Commented [BR1]: Delete load-bearing capacity

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In essence, Section 3 Environment requires that due diligence is given to the risk of damage to the structure when installing external wall cladding from water penetration either from precipitation or from condensation and in general at least one of the primary protections against this happening is to provide an unrestricted cavity between the cladding and the main structure, to allow a free flow of air usually from bottom to top to ventilate this cavity. Care should be taken to ensure that horizontal barriers do not block cavity ventilation. The use of open state (intumescent) cavity barriers allows this design and installation aim to be met.

However, what is less clear is the use of open state barriers in other locations, such as roof elements and specifically at the junction between the wall and roof elements. There is clearly a need to provide a cavity barrier between the external wall cavity and the roof cavity. On balance, there is nothing to stop the use of open state (intumescent) barriers in such locations provided the roof ventilation needs for the roof cavity and the through ventilation needs of any external wall cavity are met and that the performance levels to provide the fire resistance needs are confirmed.

DECISION:

1. It is crucial to the understanding of containment that the relationship between "cavity barriers and fire stops" are understood and correctly installed to take account of:
   - junctions with elements within the cavity such as corners, window/door openings etc, (Clause 2.4.1),
   - area constraints in cavity sizes, (subject to exceptions and Standard 2.7) (Clause 2.4.2),
   - the nature of materials exposed within the cavity and within the external wall cladding system (combustibility, limited combustibility or non-combustible) (Standards 2.4 and 2.7) (BRE135 Report); and
   - junction protection at compartment/separating walls and compartment/separating floors, (Clause 2.1.15 ND; Clauses 2.2.7 ND and 2.2.10 D),
   - the storey height of the building (we need to note the different references to building height and storey height, i.e. ND2.7.1 refers to building height whereas 2.7.2 refers to storey height. Not sure if these differences are intentional but they would be different when considering the rules of measurement.

2. Every cavity barrier attracts a fire resistance performance and confirmation of such performance levels must be confirmed when specifying open state (intumescent) barriers.

3. Provided the performance levels can be confirmed then the current guidance within the Mandatory Standards would allow the installation of open state cavity barriers **in any location** provided they are designed to be suitable for their location and which meet the performance levels on fire resistance.

4. Any consideration of where and what type of cavity barriers should be installed must also take due cognisance of the guidance contained in Section 3 Environment when considering Mandatory Standards 3.10 Precipitation and to an extent 3.15 Condensation risk. In particular, the cavity barriers installed between the roof cavity and the external wall cavity must ensure that the ventilation needs for both are not compromised.

5. Any consideration of where and what type of cavity barriers should be installed must also take due cognisance of the guidance contained in Section 6 Energy when considering the likelihood of cold bridging through and element. Non-repeating thermal bridging at the junctions of building elements and around openings in the building envelope form part of the calculation of energy performance.

6. Particular reference should be made to Modern Methods of Construction comprising off-site constructed panelised or volumetric units and wall floor and roof elements to ensure correctly installed barriers during this off-site construction process.

7. See **Appendix A: Technical Handbook and Other References**