Leviat®
A CRH COMPANY

Bringing Clarity to Masonry Support Systems and Fire Protection Cavity Barriers

White paper, February 2025

Imagine. Model. Make.

Contents

Photo credit: Jack Hobhouse

Introduction

The purpose of this white paper

This white paper aims to raise industry awareness of the interaction between cavity barriers and masonry support systems.

Most framed masonry clad buildings will require the introduction of masonry support systems, which are typically bolted to the edge of the concrete floor slab. This location, by necessity, is coincident with cavity barrier locations and careful detailing is required at the slab edge to ensure continuity and effectiveness of both the cavity barrier and the masonry support system.

What is a masonry support system?

Brick, block or stone clad framed buildings in excess of 12 metres in height will include masonry support systems unless careful, additional design work is undertaken to accommodate the greater than normal movements caused by unavoidable thermal and moisture fluctuations.

The most common form of masonry support system comprises a series of channel-type brackets spaced along the slab edge with a continuous shelf angle welded to the front of the brackets, onto which the masonry façade is constructed. Other, more elaborate systems are required to support specific architectural details. A soft movement joint is included below the shelf angle to accommodate movements in the façade panels and mitigate the propagation of cracking or the compromising of the weather tightness of the façade.

What are cavity barriers?

When designing a structure, it is essential to consider how future occupants will be protected from harm should a serious fire occur. The choice of building materials can only contribute so much to this fire protection strategy as the structure itself will have combustible materials introduced within it once occupied.

The building is therefore divided into compartments to ensure a fire and, just as importantly, smoke and fumes cannot spread through the structure at a pace that would prevent a means of escape for the occupants. Passive fire protection is used to provide this compartmentalisation and, for buildings with cavity walls, the use of cavity barriers is integral to the overall fire strategy.

Passive Fire Protection

Demystifying some common terms

Cavity Barriers

Close **designed, concealed spaces** and either prevent the passage or restrict the movement of smoke and flames. Sometimes also referred to as **fire barriers.**

Compartments

Subdivisions of a building to provide **fire separation** and slow the spread of fire within the building or to adjoining buildings.

Firestops

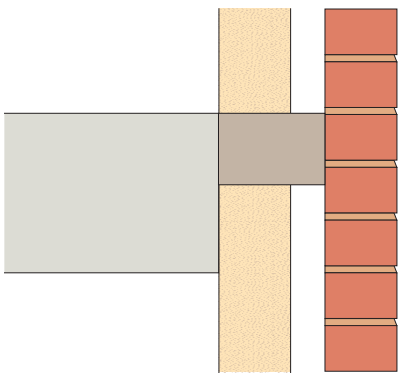
Seal up gaps resulting from **imperfections** or **design tolerances** between other fire-resisting building elements to provide **continuity** of compartment lines.

In cavity wall construction, cavity barriers are used to subdivide the cavity and break up the structure into separate compartments. Cavity barriers sit in the cavity of the wall and are positioned at compartment walls and floors, at specified centres, and at other strategic locations such as around openings. In this way, each compartment is protected from its neighbour by both vertical and horizontal cavity barriers – should a fire occur it is contained within that compartment and prevented from spreading for the designed time period.

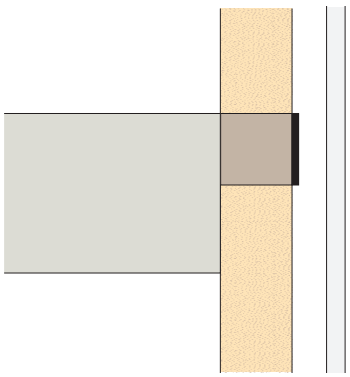
There are two types of cavity barrier; closed state and open state.

Closed state cavity barriers are also sometimes referred to as 'full fill cavity barriers'. They are typically made from mineral wool (in slab form) and are installed within the cavity, fully sealing the void between the internal structure and external leaf. Closed state cavity barriers are designed to be static; once they have been installed, the cavity is closed for the life of the building. For this reason, closed state barriers are used in non-ventilated cavities, such as behind masonry façades.

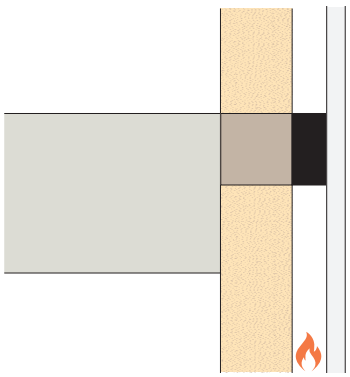
Open state cavity barriers allow a clear cavity to be maintained during normal operating conditions and only fully close the cavity in the event of a fire. Typically, these barriers contain a reactive component, such as an intumescent facing, which expands when exposed to heat and allows the barrier to bridge the residual gap and prevent the passage of smoke and flame. Open state barriers are generally used when ventilation is required behind the façade in the 'cold' state, such as in rainscreen cladding applications.



Closed State Cavity Barrier



Open State Cavity Barrier ('Cold' Condition)



Open State Cavity Barrier ('Hot' Condition)

For advice on the most appropriate cavity barrier for a specific application, please refer to manufacturer guidance.

Photo credit: CARA Brickwork

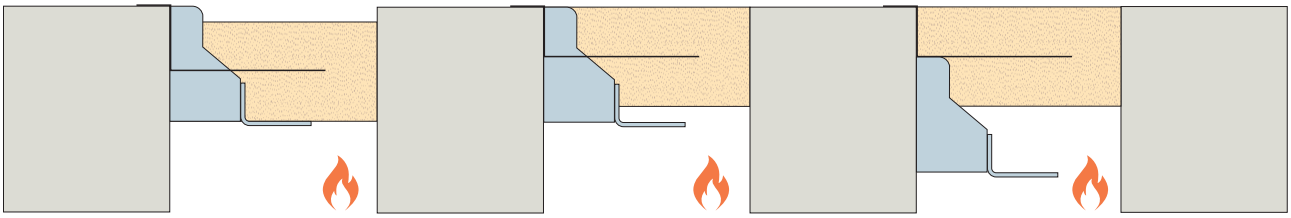
Leviat's Approach

At Leviat we aim to provide our customers with the maximum possible freedom of specification choice whilst still maintaining peace of mind wherever our products are required to interact with products from other disciplines.

We have identified a need for greater understanding and more robust data regarding the interaction between cavity barriers and masonry support systems and have taken a collaborative approach with all the main cavity barrier suppliers in the market to address this. By working with numerous suppliers across the industry, we have improved the guidance available whilst ensuring customers have the freedom to decide which type and make of cavity barrier to adopt.

This approach has been viewed favourably by the industry and has allowed us to work closely with cavity barrier manufacturers and suppliers to ensure the Ancon masonry support systems have been thoroughly tested where they interact with cavity barriers. We have carefully considered how our systems interact with cavity barriers and have collaborated on a number of physical fire tests using various support system profiles and wall build-ups to improve the amount and quality of data available.

To further enhance our findings to date, we are continuing to collaborate with industry leaders on further testing of our masonry support systems in conjunction with cavity barriers. As interaction between these products can be complex and varied, additional testing will provide a greater depth of data and cover more of the scenarios that we typically encounter.



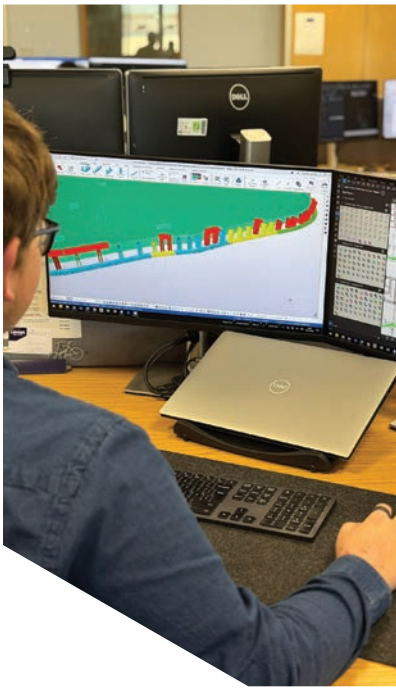
Sections showing typical fire test details; Masonry support bracket fully penetrating the cavity barrier, bracket level with top of cavity barrier and bracket partially penetrating cavity barrier.

“At ARC Building Solutions, we share Leviat's belief that collaboration among manufacturers in the construction supply chain is essential to fostering a culture of continuous improvement. Our partnership with Leviat was both insightful and productive, resulting in test reports, third-party certification, and a Field of Application report. These achievements are demonstrative of our commitment to customer safety and our dedication to an integrated design process within the construction industry.”

ARC Building Solutions

“At fischer, we are constantly seeking opportunities to enhance and develop our solutions. However, most construction systems rely on a combination of materials from various manufacturers, making collaboration essential. This highlights the importance of progressive partnerships between manufacturers and system developers. Our collaboration with Leviat was highly productive, enabling us to provide valuable product and performance insights for the façade industry, ultimately helping to elevate safety standards to the highest level.”

fischer fixings



“In recent years there has been a significant increase in the need to provide test evidence to demonstrate the performance of fire barriers in particular situations: the interface with masonry support shelves being a good case in mind. For AIM, it was the obvious choice to work with Leviat to identify the right materials and configurations required not just for the test but also to provide installers with practical, workable solutions.”

AIM - Acoustic & Insulation Manufacturing

"Leviat’s knowledge and expertise has been invaluable in allowing us to work together and provide solutions for challenging interfaces. Together, we have been able to deliver clear direction to our shared customers on how to deal with these in practice.

It is refreshing to have such proactive engagement from another industry manufacturer, to allow us to strive for betterment together and promote collaboration. These achievements are demonstrative of our commitment to customer safety and our dedication to an integrated design process within the construction industry."

Siderise

Regulations

Overview

Fire safety in England and Wales is regulated by Approved Document B, Volumes 1 and 2, 2019 edition (with 2020 and 2022 amendments).

- Approved Document B Volume 1 deals solely with dwellings including flats.
- Approved Document B Volume 2 deals with all other types of building covered by the Building Regulations.

Separate but similar regulations exist for both Scotland and Northern Ireland. In Scotland the building regulations are contained in one document (The Building (Scotland) Regulations 2004), whilst in Northern Ireland Technical Booklet E 2012 deals with fire safety.

The Building Safety Act (BSA), which came into force on 1st October 2023 as a response to the tragic events at Grenfell Tower, introduces new primary and secondary legislation in England and Wales*. It aims to overhaul and fortify safety standards across the construction sector by bringing accountability and competency to the forefront of every building project.

*The Welsh Government has devolved powers, allowing some flexibility to how the BSA is applied in Wales.

Minimum requirements

The performance of a cavity barrier is classified in terms of two criteria:

- Integrity (E) – How long before sustained flaming occurs through the cavity barrier.
- Insulation (I) – How long before the temperature above the cavity barrier is increased by 180 degrees centigrade.

The minimum requirements specified in Approved Document B are:

- Integrity (E) – 30 minutes
- Insulation (I) – 15 minutes

Note: These are the codified minimum values but, in practice, the project design team may specify higher fire rating requirements. These more stringent values would then become the de facto minimum for that specific project.

Strictly speaking, at the time of writing, neither closed nor open state cavity barriers are fully covered by an official EN test standard. Therefore, closed state cavity barriers are typically tested in accordance with the principles of BS EN 1366-4:2021, which is actually a test for linear joint seals, and open state barriers are tested to TGD19. Work is underway to produce an EN test standard to cover both closed and open state barriers (PrEN 1364-6), which will eventually provide an official test methodology for manufacturers to follow.

Who is responsible?

The design and construction of buildings is a joint responsibility across the entire supply chain from architects and designers to contractors, consultants and manufacturers. By working together, we can improve the quality of buildings and ensure they perform as designed with respect to fire, thermal, structural and acoustic requirements.

The BSA includes a legal obligation for all individuals and organisations to be competent to ensure compliance with the Building Regulations in both design and construction.

Dame Judith Hackitt's Golden Thread

In her report, 'Building a Safer Future: Independent Review of Building Regulations and Fire Safety', Dame Judith Hackitt proposed the adoption of a golden thread of information to preserve a property's original design intent. It is essentially a complete record of all the information related to a building, which is kept and passed along the supply chain in order to provide transparency and accountability. It's proposed that keeping a permanent digital record of the material composition of a building's fabric, for example, will ensure regulatory fire safety and energy performance is maintained in the event of structural alterations. It also acts to ensure that what has been built is as designed.

The government has made a commitment to implement Hackitt's golden thread recommendations as part of a more stringent building regulatory regime. A defining element of the Building Safety Act is a golden thread of information, which will provide a digital audit trail of information throughout the life of a building.

The importance of early involvement

It is incumbent on all parties to have a role in ensuring that buildings perform as designed. A manufacturer may only be involved in a very narrow aspect of an overall building, but if they can engage with designers, specifiers and contractors from the outset, then they can make sure that whatever product is provided, it will be compatible and fit for purpose with the rest of the scheme.

Engagement and communication throughout the supply chain at the earliest stages of a project will lead to effective collaboration and a reduction in project risk. This will optimise a building's design, improve buildability and create opportunities for innovation.

Early engagement may also negate costly design mistakes. When details are considered in isolation, it often leads to clashes or insufficient space for later trades and, in the worst case, necessitates a suboptimal solution. Slab edge details are a prime example of this common issue where the slab is designed as thinly as possible to save costs and it is later discovered that a masonry support system, cavity tray and cavity barrier are all required to co-exist in the same location. The addition of a simple downstand at the slab edge would relieve the congestion whilst not having a significant impact on overall building costs.

Installation and competency

Installation also plays an important part in the performance of a product. In the first instance, manufacturers must ensure their product is designed and developed to be as easy to install as possible. When a product is overly complex, the risk of failure will be increased. Users need to know how products will fit together; installation animations and layout drawings are vital for the installer and show step-by-step instructions and best practices. Furthermore, it is important to accurately label products so that when they arrive on site, they can be easily referenced and identified by contractors as to the different sizes and product types.

To summarise, a product that is simple for the end user to understand and install is essential. Software and installation guides will play an important role in this and good remote access to manufacturers' expertise ensures good practice. Manufacturers should not be in a situation where they need to be constantly on hand to guide somebody; it should be as simple as possible for the user to install.

A product should be selected based on a standard detail from a manufacturer and then a competent installer needs to be able to demonstrate they have installed the solution based on that standard detail. This becomes an audit trail and demonstration of compliance with building regulations.

To promote good installation practice, many cavity barrier manufacturers offer installation training and site support - contact your chosen manufacturer for further information.

Ancon MDC Masonry Support Systems

Common details

Cavity barrier fully penetrated by Ancon MDC Masonry Support System

Cavity barrier with 50% penetration by Ancon MDC Masonry Support System

Conclusions

Cavity barriers and masonry support systems are both critical building components and there has never been a more important time to raise awareness within the industry of how the two interact.

The new Building Safety Act puts emphasis on accountability and competence across the design process and experience has shown that early involvement from all parties is integral to producing a clear, comprehensive and cohesive design.

Working with multiple other manufacturers, Leviat has contributed to improving the quantity and quality of cavity barrier and masonry support fire test data. Our collaborative approach has enhanced knowledge and understanding of this issue across the sector and our ongoing work will continue to build on these foundations.

For more information on our work and how we can help with your next project, please contact us.

Useful Resources

Cavity Barriers tested with Ancon Masonry Support

AIM Wall Cavity Barrier

ARC Fire Stop Slab

Certifix Wall Cavity Barrier (Red Edition)

Fischer Cavity FireStop Clad – FCFcl Plus

Knauf Rocksilk® RainScreen FFCB

Rockwool FirePro SP FireStop EN

Siderise EW Closed State Cavity Barrier and Firestop

Datasheet Quick Links

AIM Wall Cavity Barrier (Red Edition)

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Rockwool FirePro SP FireStop EN

Siderise EW Closed State Cavity Barrier and Firestop

Further Reading on Passive Fire Protection

ASFP Technical Documents

- Red Book
- Ensuring Best Practice for Passive Fire Protection in Buildings
- TGD 17

PAS 9980 - Fire Risk Appraisal of External Walls and Cladding of Flats

SCI P438 – Cavity barriers in light steel framed buildings


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