

Structural timber buildings fire safety in use

Volume 2 - Cavity barriers and fire stopping for timber frame structures

STA fire safety research project | Version 3.0 | April 2024



Introduction

The Structural Timber Association's objective in developing this document is to provide current state-of-the-art solutions for cavity barrier installations and a clear understanding of who is responsible for design, supply and installation. Consideration has been given to industry good practice and the best-in-class solutions are included, with recommendations for increased fire resilience for low to medium-rise structural timber buildings.

The STA appointed a fire safety task team to peer review the contents of this guidance and would like to thank the following: Martin Milner (Chair, technical consultant and principal author), Robin Dodyk (Cala Group), Alex Cook (Oregon Timber Frame Ltd), Steve Griffiths (Taylor Lane), Alan Brodie (Scotframe), Darren Jarman (Lowfield Timber Frame), John Simpson (Donaldson Timber Systems), Nick Worboys and Geoff Arnold (Pinewood Structures Ltd), Sam Dawe (Innovare Systems), David Fleming (Flex Business Services), Laurence Ashley (Milner Associates) and Andrew Orriss (Structural Timber Association).

Copyright and document limitations

This document is for use by competent persons, from the structural timber industry and built environment, who understand the sector they work in. While this document has been prepared in good faith and all reasonable efforts have been made to ensure its adequacy and accuracy, no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by the Structural Timber Association.

The information contained within this document is held under STA copyright. The information is provided in good faith and should not be solely relied upon as advice. STA does not permit, under copyright law, any organisation to publicly present or reproduce any information contained within the guidance in part or in full.

STA Assure

Please note that timber frame systems performance declarations only apply when supplied and/or erected by STA member companies, operating under the STA Assure Quality Scheme. They do not apply to non-member companies engaged in the supply and install of timber frames, regardless of any similarity of systems. For additional information on the STA Assure quality scheme <https://www.structuraltimber.co.uk/members/why-use-an-sta-member>

STA compliance audit

STA have provided members with a cavity barrier training manual and an online test for compliance. It is recommended that installers can demonstrate they have adopted the training manual and passed the online test. STA installers are also committed to providing a technical trail and sign-off for installing cavity barriers, which is part of the STA Assure audit. STA members should be aware of this guidance and their contract obligations when installing cavity barriers.

April 2024, Structural Timber Association

Disclaimer

It is important that you read and understand this statement before making use of this document.

This document is a publication of the Structural Timber Association Limited (“STA”).

The information contained within this publication is provided by the STA as industry insight and/or for general information purposes only. The publication has not been prepared to meet the individual requirements of any particular construction project and it is your responsibility to ensure that the construction materials, techniques and processes are suitable for that particular use.

The information contained within this publication is not intended to amount to, nor should it be relied upon as, formal advice or guidance (including from any qualified professional). The information provided is only to be used and acted on by suitably qualified individuals or under the supervision of suitably qualified individuals.

The information in this publication is not to be used as a substitute for obtaining suitable independent, professional, qualified and/or specialist advice. If you are not a suitably qualified professional (i.e. a structural engineer and/or architect), you must obtain your own independent, specialist advice from a qualified professional for any construction project.

Where this publication contains information provided by a third-party, including any link to a third-party website, the STA is not responsible for the taking of, or the refraining from, any action on the basis of such third-party content and does not accept liability for any loss or damage arising from the use of such third-party content.

Except for death or personal injury caused by STA's negligence, or for loss or damage caused by STA's fraud or fraudulent misrepresentation, the STA shall not be liable for any loss of profit, loss of revenue, loss of business or loss of contract, loss of opportunity, loss of goodwill, or loss of reputation, or any indirect, special, or consequential loss arising out of, or in connection with, this publication.

© 2024 Structural Timber Association Limited. All rights reserved.

Document revision history

Version 1.0 - February 2020 (first edition)

Version 2.0 - June 21

Updated text on tests, STA Assure, clarification of recommended and minimum levels, new drawings in parts 3 and 4, updated part 5.

Version 2.1 - March 2022

General update on descriptions throughout and additional clarity on a number of the guidance's details.

Version 3.0 - April 2024

Full guidance review with revised sections, new Appendix 7 added, plus updated industry details.

Useful documents

This document provides concept locations and installation approach for cavity barriers based on the statutory guidance current at the time of publication.

Users of the document are to check for updates in statutory guidance and the STA web site for changes as they occur.

Other relevant STA documents:

1. Technical Note 12 - cavity barriers around openings [1]
2. For vocabulary of roles in a timber building project refer to STA Technical Note 31 [2]
3. STA cavity barrier guidance document - installation aid for site [3]
4. STA cavity barrier installer training manual [15]
5. STA cavity barrier installation poster [16]
6. STA Advice Note 7.3 - Fire Safety Strategy (FSS) for structural timber buildings [7]
7. STA Insight 1 - Fire safety of external walls, issued spring 2024 [17]

Contents

Introduction	2
Copyright and document limitations	2
STA Assure	2
STA compliance audit	2
Disclaimer	3
Document revision history	3
Useful documents	4
1. Overview	7
1.1 Scope of document	7
1.2 Roles and responsibilities	7
1.3 Who should read this?	7
1.4 Recommendations	8
1.5 Clarification of key terms	8
2. Cavity barrier and fire stopping: basic requirements	9
2.1 The difference between cavity barriers and fire stopping	9
2.2 Cavity barrier provisions and limitations	10
2.3 The choice of cavity barrier or fire stopping	11
2.4 Fire resistance performance of cavity barriers	11
2.5 Fire resistance envelope	12
2.6 Cavity barrier key points	13
2.7 Fire stopping key points	13
2.8 Functional requirements of cavity barriers and fire stopping	14
2.9 Cavity barrier Building Regulation compliance	15
2.10 Tolerance of cavity barrier installation	16
2.11 Tolerance of fire stopping installation	16
2.12 Fire safety information	16
3. Roles, responsibilities and accountability	17
3.1 Design	18
3.2 Supply	15
3.3 Installation	19

4.	Cavity barrier locations	21
4.1	Background to locations and details	21
4.2	Cavity barrier locations.....	21
4.3	STA good practice locations.....	22
	4.3.1 Locations for resilience; single dwelling	23
	4.3.2 Locations for resilience; multi occupancy.....	25
	4.3.3 Locations for Statutory Guidance compliance (E&W); single dwelling.....	27
5.	Good practice concept details	29
6.	Cavity barrier installation care points.....	57
6.1	Care points for contract agreement.....	57
6.2	Care points for designers.....	58
6.3	Checklist for designers.....	59
6.4	Care points for installers/checkers	60
6.5	Care points for structural timber frame erectors.....	62
6.6	Care points for masonry cladding: brick/block/stone layers	63
6.7	Care points for external cladding installers.....	64
6.8	Care points for roofing contractors installing felt/battens and tiles	65
6.9	Care points for soffit eaves verge installers.....	66
7.	Appendices	67
	Appendix 1: Terms used in this document.....	67
	Appendix 2: Cavity barrier regulation guidance.....	68
	Appendix 3: Cavity barrier and fire stopping compliance	69
	Appendix 4: Cavity barrier options for the external wall cavity	71
	Appendix 5: External cavity barrier suitability check	73
	Appendix 6: Cavity barrier options for internal wall cavity	75
	Appendix 7: Cavity barrier research by Milner Associates.....	77
8.	References and additional information	83
8.1	References.....	83
8.2	Building Regulation guidance	83

1. Overview

1.1 Scope of document

A technical resource to support designers, suppliers, installers and checkers to decide if the design solution achieves resilient fire safe structural timber buildings. The guidance presents industry agreed locations and detailing for cavity barriers and associated fire stopping in timber frame building structures where the Fire Safety Strategy permits the use of the statutory guidance for fire safety.

The relevance of guidance in this document is likely to be limited to buildings that have an upper floor height no greater than 11m from the external ground level. The details may be acceptable for buildings higher than this but additional checks are recommended for the construction materials in the wall and floor total build - and also to the technical requirements needed to comply with the fire resistance, building stability and cavity enclosure fire robustness required.

1.2 Roles and responsibilities

A Principal Designer has the responsibility to plan, manage and monitor a project which includes the fire safety requirements for cavity barriers and fire stopping. Under their management there may be another Principal Designer or several parties involved in the building design. For example building designer, timber frame designer or facade engineer may be included within the roles and responsibilities in a contract, providing information back to a Principal Designer.

For the purposes of this document the role and responsibility for cavity barriers and fire stopping shall be referred to as the Building Designer.

A contract shall clearly note the roles and responsibility of the Building Designer for Cavity Barriers and fire stopping. See part 2 and part 5 for details.

1.3 Who should read this?

The document should be read by Principal Designers, Building Designers, architects, structural and fire engineers, specifiers, contractors, third party inspectors, structural timber suppliers and other product suppliers.

Regardless of what is recommended as good practice, the responsibility for determining the location of cavity barriers and fire stopping rests with the Principal/Building Designer (see STA vocabulary of roles in a timber building project Technical Note 31, [2]).

The Principal Building Designer, not the structural timber building frame designer or supplier, must understand their responsibility for determining and checking the location and suitability of cavity barriers and fire stopping where needed. Contract documents should be explicit in the roles and responsibilities.

Information presented follows STA industry reviews from design through to installation procedures. This work, which is not just restricted to structural timber buildings but applies to all forms of buildings, identified the need for fire safety at an increased level of understanding, plus processes that address unavoidable construction tolerances.

Sections are highlighted to enforce the importance and relevancy of that particular part of the document.



1.4 Recommendations

The STA recommend that a Fire Safety Strategy is provided for all structural timber frame buildings. STA Advice Note 7.3 - Fire Safety Strategy (FSS) for structural timber buildings [7] provides guidance as to when a fire engineer might need to be engaged to provide the Fire Safety Strategy.

The STA recommend that the building project team refer to Part 3 of this guidance and STA Technical Note 31, covering the roles in a structural timber building project [2].

STA also recommend their cavity barrier installer training manual and an online test for compliance. Further details on the STA website.

For projects in Scotland where the technical handbook has been revised to include a statement to extend the line and maintain the fire resistance duration, of a wall or floor, then the design shall ensure that the proposed details are agreed with Building Control before construction. STA Insight 1 [17] provides guidance on compliance with the principles for low rise buildings, in extending the line of fire resistance duration which is not necessarily a direct straight line, but one that follows the compartment to the external walling.

1.5 Clarification of key terms

It is important to understand both the specific terms used in this guidance, plus alternatives in common use (often regional), relating to the specification and installation of cavity barriers and fire stopping.

Fire barrier

A general term used in Scotland for a form of construction that is more than a cavity barrier and performs the function of what might be described as a fire stop. The term addresses the concern that standard cavity barriers installed in low rise buildings are not suitable for higher rise buildings, particularly where open state cavities are needed with curtain walling. It is a term that should make the designer stop and think about the design function. The term 'fire barrier' is not used in this document.

Cavity stop

Also known as a timber stop or fire batten. It is a term used in parts of the UK to describe a cavity barrier. The term 'cavity stop' is not used in this document.

Mineral wool

A term generally used to describe stone wool insulation. Glass wool insulation, although a type of mineral wool, is not used by many to describe the product. For this guidance the term mineral wool refers to stone wool insulation.

Party, compartment, separating

Terms to define a wall or floor that separates one dwelling from another or separates two fire resistant protected rooms. This guidance uses party wall/floor or compartment wall/floor, but the term also applies to separating wall/floor as the terms are interchangeable.

2. Cavity barriers and fire stopping: basic requirements

Essential designer
knowledge



Essential installer
knowledge



2.1 The difference between cavity barriers and fire stopping

To understand the difference between a cavity barrier and a fire stopping function the concept of a fire-resisting envelope is provided. The fire resistance envelope is the term given by the STA to explain where the line of fire resistance starts at the building wall, floor or roof.

The fire resistance envelope is part of the design process of a building and should be found in the Principal Designers fire safety strategy document for the project (see STA Advice Note 7.3).

Fire stopping is a functional requirement to complete the fire resistance over a gap in the line of a fire resistance envelope. Fire stopping might be considered as a “patch” over a gap, so that there is continuity of fire resistance, for example, at junctions or penetrations in a fire resistance lining. From a fire engineering viewpoint, fire stopping is the technically demonstratable means of maintaining the fire resistance envelope.

The application of cavity barriers is described in Building Regulation statutory guidance documents (e.g. Approved Document, Technical Booklet and Technical Handbook) as closing the ends of a cavity space, for example, where a doorway opening occurs in a wall, or dividing up large cavity spaces, such as at 10m intervals. The statutory guidance documents provide statements that cavity barriers deliver the functional requirement of the Building Regulation statements for each country, requiring hidden spaces to include designs that “inhibit the passage of smoke and fire”.

Unlike fire stopping which has a direct correlation to the fire resistance envelope, a Building Designer is provided with a standard stated cavity barrier performance regardless of the building fire resistance classification. This has been the approach to building designs since the Statutory Guidance was first presented. The guidance documents all agree that cavity barriers require evidence of at least 30 minutes integrity (fire or smoke to break through). In England, Wales and Ireland an additional requirement of 15 minutes insulation (the point at which the temperature exceeds 180 degrees) is required. Furthermore, the statutory guidance documents for specific locations around windows and doors are deemed to satisfy solutions where no evidence of performance is required. These solutions include mineral wool (stone) sock or timber batten.

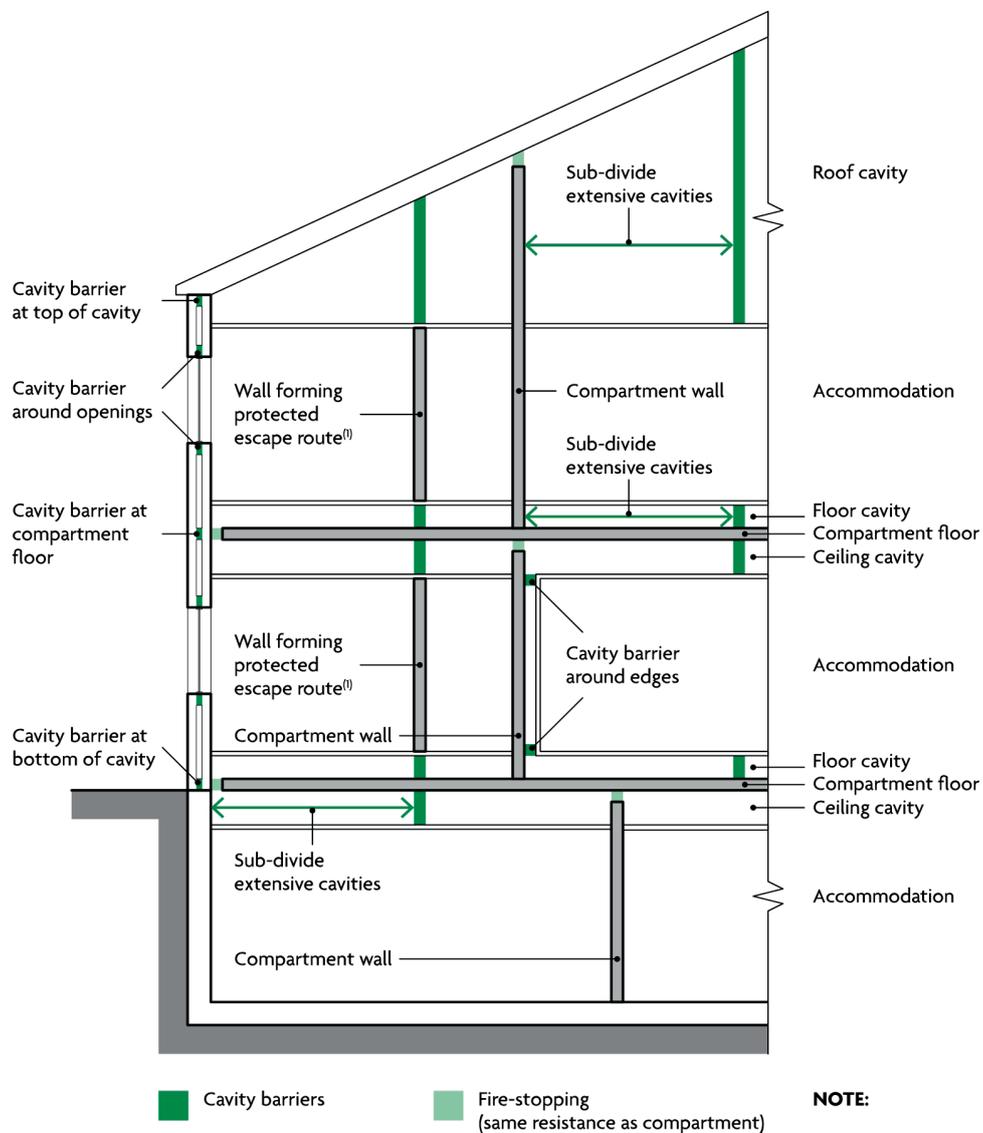
Under a fire engineering view of fire stopping function, the cavity barrier is not necessarily a continuation of the fire envelope as its design is limited to the functional requirement of a different purpose. In the current UK environment of reconsidering all points of fire safety from first principles, the Building Designer can be challenged to decide if the project requires a cavity barrier function or a fire stopping function. To avoid investigation or hindsight design judgement, the use of fire stopping is being increasingly adopted.



2.2 Cavity barrier provisions and limitations

When installed correctly, cavity barriers have been seen in practice to provide the functional requirement to inhibit smoke and fire. They provide resistance to the draw of air needed for rapid fire growth and provide the fire service time to tackle the fire.

Cavity barriers are currently described in statutory guidance as complying with the Building Regulation functional requirements for cavity spaces and it has been accepted that the Building Designer is reasonable in following this guidance. There are clear distinctions between cavity barrier and fire stopping functions in the statutory guidance documents, as reproduced diagram below.



The differences between cavity barriers and fire stopping (download [HERE](#))

Taken from statutory guidance, Fire safety: Approved Document B, December 2022 update



2.3 The choice of cavity barrier or fire stopping

The Building Safety Act 2022 is also being applied in principle, and where relevant, to lower-rise buildings - not just high-risk buildings. Consequently, there are fire engineering reviews on when cavity barriers or fire stopping should be used. Despite the established use of cavity barriers installed to the statutory guidance recommendations and a history of success when installed correctly, there is some debate as to the need to have fire stops, rather than adopting conventional solutions of cavity barriers.

The STA cannot provide Building Designers with a decision on when to use fire stopping or cavity barriers as this is specific to each project. In providing this document the STA presents Building Designers with the locations of cavity barriers, however, the fire resistance levels are still to be matched to the fire safety strategy for the building and this may be discussed with the approval body for the project and what is appropriate agreed upon.

The STA is working with industry stakeholders and policymakers to obtain clarity on the appropriate application for cavity barriers or fire stopping.

2.4 Fire resistance performance of cavity barriers

To support the industry the STA has requested Milner Associates undertake research testing on the performance of cavity barriers commonly used in the industry. The summary of the current tests is presented in Appendix 7.

Building designers are to decide whether the Building Regulation statutory guidance deemed to satisfy solutions or benchmarked tested solutions for cavity barriers are appropriate for their project. The STA advise that an appropriate fire safety strategy for each project is provided (see Advice Note 7.3) and that the building approval/warranty body be consulted before agreeing on the use of a cavity barrier or fire stop.



2.5 Fire resistance envelope

The fire resistance envelope can be external or internal and has a time duration minimum as given in the Building Regulation statutory guidance. The fire resistance period of the building fabric assembly is evaluated under the three criteria limits of structure (R), integrity (E) and thermal insulation (I).

Below is a diagrammatic representation of a fire resistance envelope to assist designs in visualising the points of difference for cavity barriers or fire stopping functions. For more details see STA Insight 1 [17].

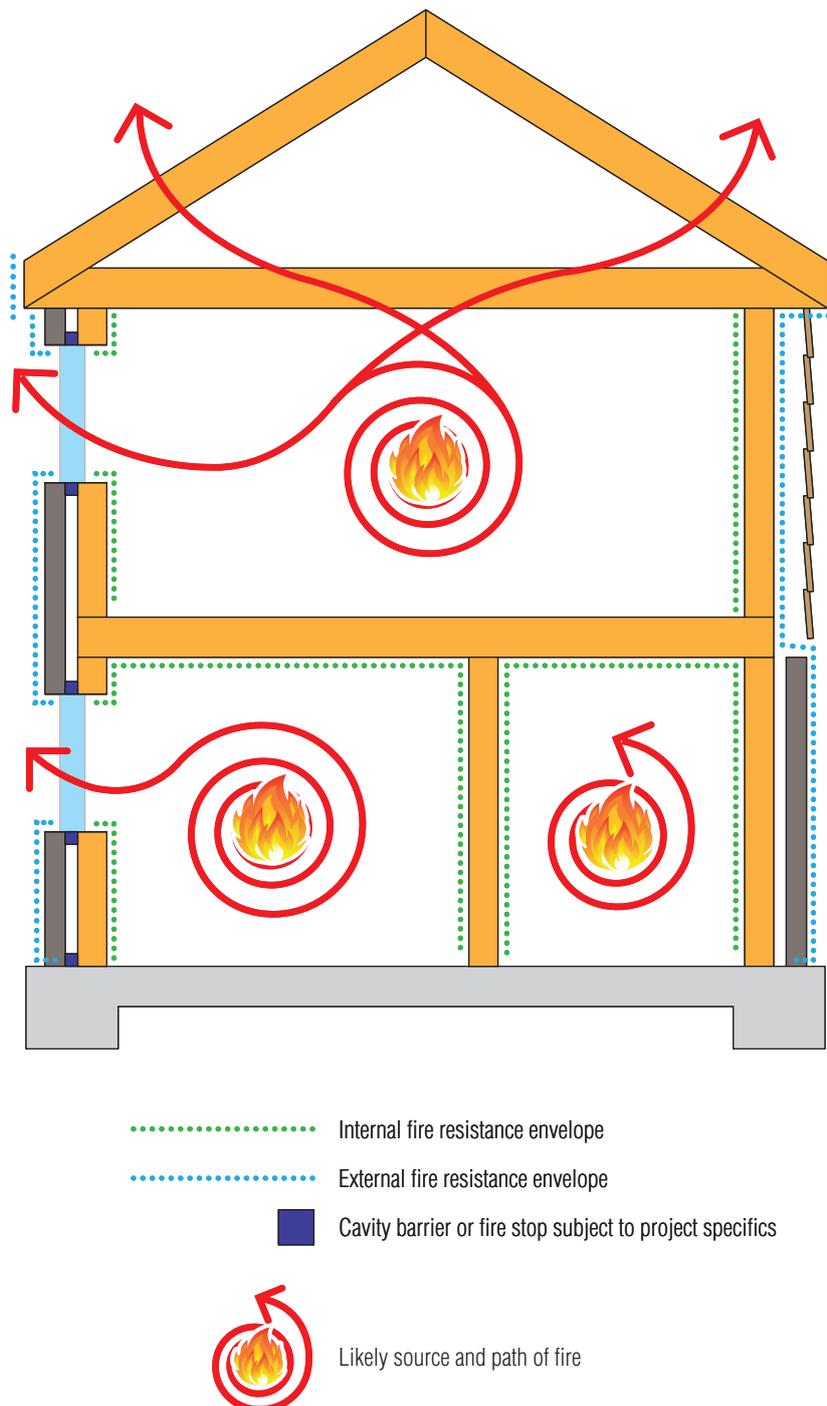


Figure 1.1: Diagrammatic view of the fire resistance envelope

2.6 Cavity barrier key points

1. The Building Designer follows the project Fire Safety Strategy for the project cavity barrier requirements.
2. The cavity barrier functional objective is to inhibit the spread of fire (flames and smoke) not to necessarily stop it; delaying spread from beyond the point of origin. It is for this reason there is a time requirement, which can be found in the appropriate country's statutory regulation guidance.
3. A cavity barrier's location is dependent on the use of the building, its size, and on the location in the building.
4. When fire occurs in a building, a vented/ventilated cavity can act as a chimney for smoke and flames. The cavity barrier can restrict air flow which will delay the passage of smoke and fire.
5. Gaps of consequence in a cavity barrier may allow fire to spread between the gaps. A consequential gap is where there is an air draw through the gap which flames and smoke will penetrate.
6. Cavity barriers are to be fitted in accordance with the barrier manufacturer's recommendations. It is expected that the barriers will be specified to be tight fitting (under compression for mineral wool) and without gaps which may cause spread of fire.
7. The location and product design falls under the Principal Designer's responsibility, not the structural timber building supplier unless agreed in the contract - see part 3. The Principal Designer shall satisfy themselves that if principles in this document are adopted then they are relevant to the specific the project they manage.
8. The design and installation of the cavity barrier shall follow the care points list presented by the STA (see Part 5).
9. Installation of the cavity barrier shall be to the Builder Designer's design and specification (as managed by the Principal Designer). If no design sign off is present - see part 5 the installer shall confirm with the Principal Designer as to the actions to take.

2.7 Fire stopping key points

1. The Building Designer follows the project Fire Safety Strategy for the project fire stopping requirements.
2. Fire stopping to provide continuation of the fire resistance envelope where gaps are present.
3. Fire stopping to match substrate to which it is attached and have third-party verification for the application in the project design specification.

2.8 Functional requirements of cavity barriers and fire stopping

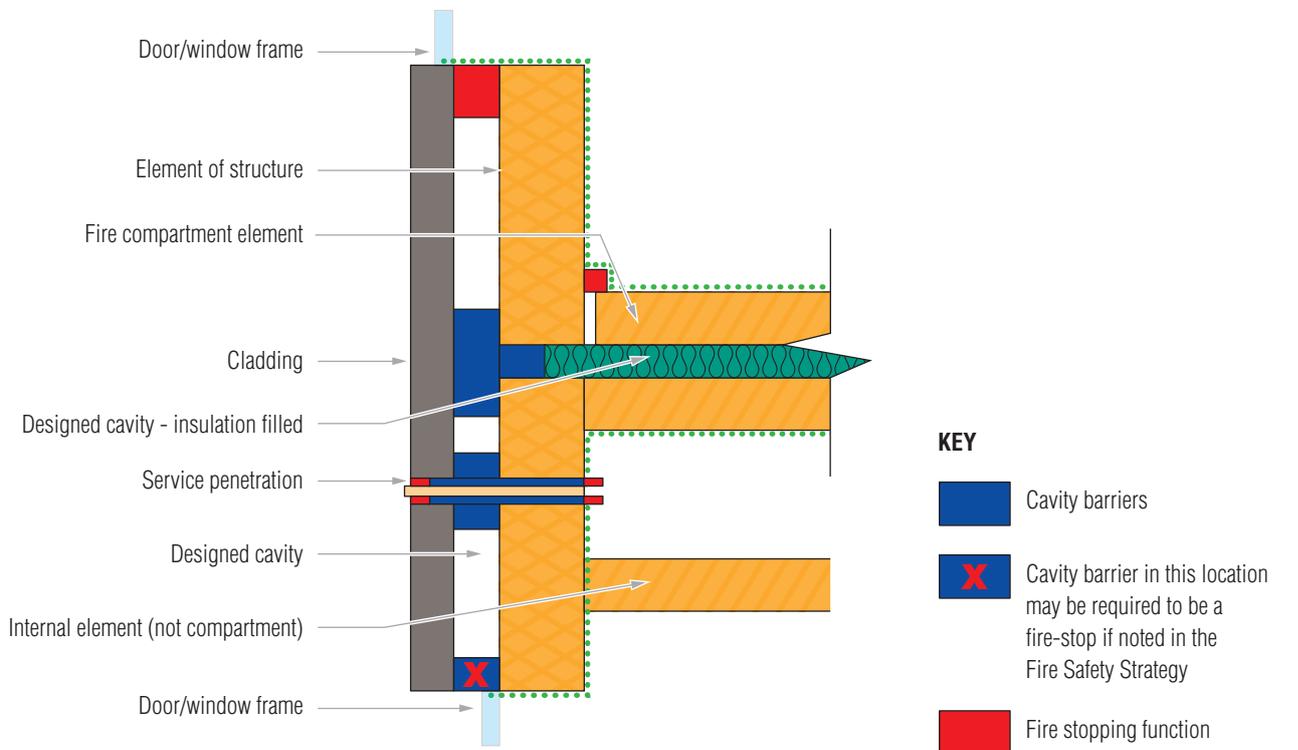


Figure 1.2: Diagrammatic plan of a wall assembly - generic cavity detail

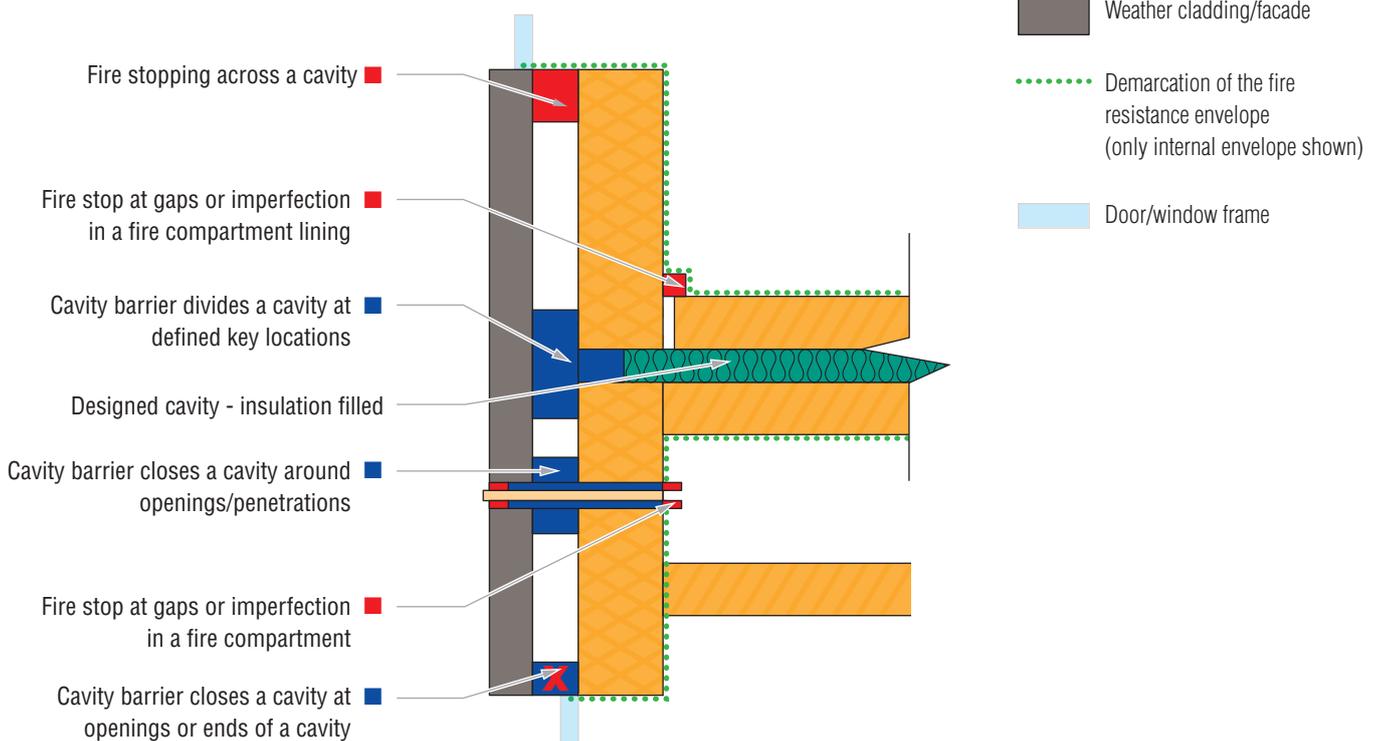


Figure 1.3: Diagrammatic plan of wall assembly - cavity barrier and fire stopping locations

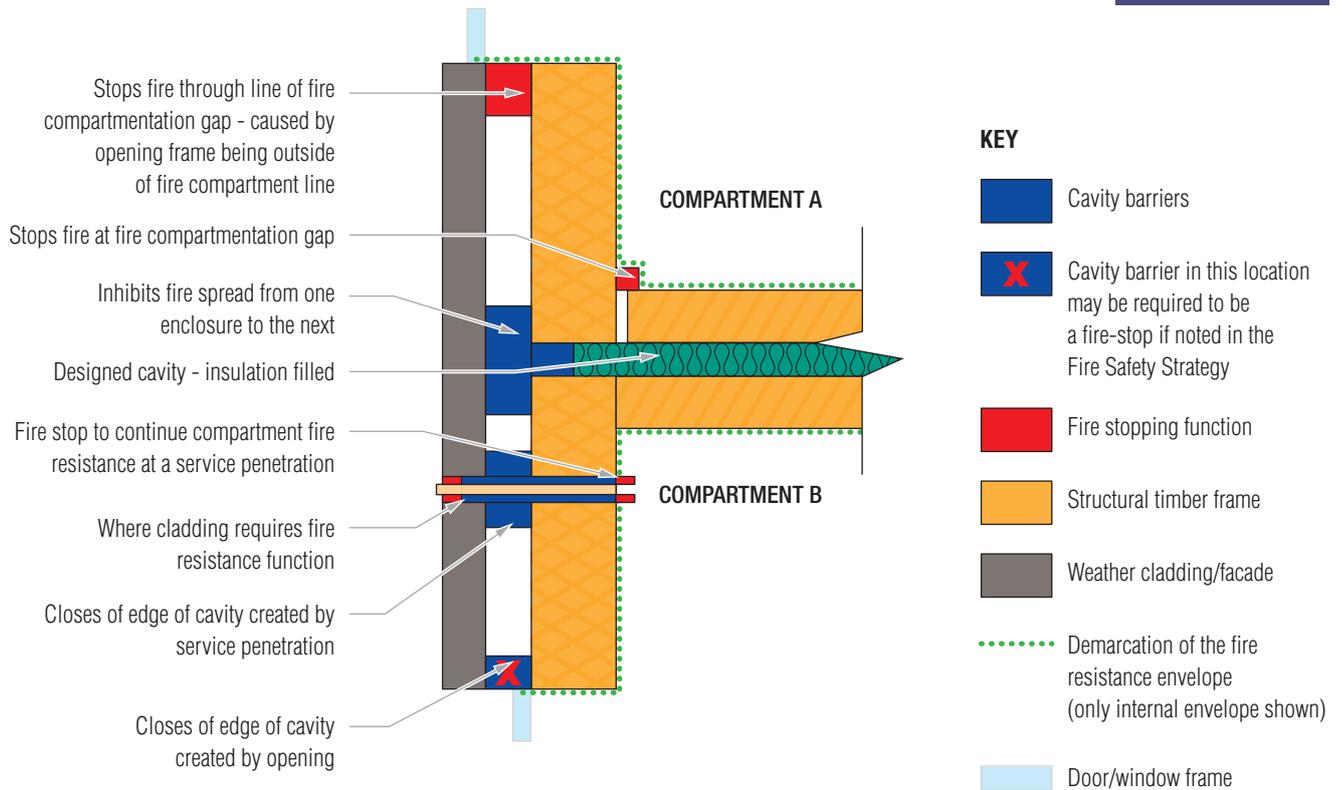


Figure 1.4: Diagrammatic plan of wall assembly - cavity barrier and fire stopping notes regarding function

2.9 Cavity barrier Building Regulation compliance

Building Regulations give functional requirements, not details. For example in England, Building Regulation B3 [4] states:

“The building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited”.

The Building Designer (which is directed or undertaken by the Principal Designer) shall decide how this is achieved. Statutory Guidance documents, for example Approved Document B (England) [5], N. Ireland [9] and Wales [8] and Technical Handbook (Scotland) [4], are used to direct designers and approval bodies on how to achieve the Building Regulation functional requirement for common building situations. Other methods can be provided such as a fire engineering approach and appropriate peer reviewed solutions. The STA has taken the regulatory requirements and presented information on minimum and recommended standards which should be achieved in cavity barriers and relevant fire stopping.

The Principal Designer manages the Building Designer and other parties with design responsibility to ensure that the Building Regulation requirements are achieved, which is commonly demonstrated by following statutory guidance recommendations.

ENGLAND: REGULATION B3 [4]	SCOTLAND: STANDARD 2.4 [6]
<p>Internal fire spread (structure) The building shall be designed and constructed so that the unseen spread of fire and smoke within concealed spaces in its structure and fabric is inhibited.</p> <p>Intention - as defined in the Statutory Guidance Approved Document B [5] Inhibition of the unseen spread of fire and smoke in cavities, in order to reduce the risk of structural failure and spread of fire and smoke, where they pose a threat to the safety of people in and around the building.</p>	<p>Every building must be designed and constructed in such a way that in the event of an outbreak of fire within the building, the spread of fire and smoke within cavities in its structure and fabric is inhibited.</p>
Northern Ireland and Wales similar to England	

Table 1.1: Regulation requirements for England, Scotland, N. Ireland [9] and Wales [8]

2.10 Tolerance of cavity barrier installation



In the event of a fire, significant gaps may, if ventilation conditions are right, allow hot gases to pass a barrier and create conditions to ignite the elements on the other side of the barrier. The installation of barriers to inhibit or stop fire should be subjected to a quality control process and signed off that they are appropriate.

The STA have a quality installation programme for its members. The STA Assure process for cavity barrier installation covers the installer training and sign off that the barrier has been installed correctly; presenting the customer with a technical trail of installation plus the provision, where appropriate, of follow on trade information to reduce errors or mistakes by others during the build process.

The time point at which a cavity barrier is installed is important to ensuring the correctness of installation. If a cavity barrier is installed before the cavity is formed then the responsibility of compliance and tolerance rests with the follow-on trade that completes the assembly. A cavity barrier installed to the open air has no measure to determine what the tolerance may be and the installer in this condition can only follow the design intent.

The roles, responsibility and accountability for the tolerance of installed cavity barriers are to be agreed.

2.11 Tolerance of fire stopping installation



Fire stopping is to fully fill the imperfection. Products shall have sufficient depth to provide fire resistance (integrity and insulation) and not allow fire to bypass it via the burning and reduced section of abutting timber structural elements.

2.12 Fire safety information



For any building work there is a legal requirement to provide summary fire compliance documents to hand over to the Principal Designer, who in turn passes it to the building “responsible person”. Each country has its own regulations relating to the responsible person, but its function is to provide information to the building owner so they may understand fire safety elements, so not to alter or remove them without appropriate action when undertaking maintenance or in the event of alterations to the building.

3. Roles, responsibilities and accountability (RRA)

Essential designer knowledge 

Essential contract understanding 

3.1 RRA for design

SUBJECT	LOCATION	FUNCTION	ROLE	RESPONSIBILITY	ACCOUNTABILITY
CAVITY BARRIER	External envelope = through the wall assembly (façade cavity to structural frame and internal service void, roof eaves to external wall, floor to external wall interface and termination of external wall cavities)	To close off cavities so to inhibit hot smoke and fire spread within relevant cavity compartments	To present justification and drawing on the location and specification	Building Designer ¹	Compliant to the Statutory Guidance OR BS9991/ BS9999 OR Fire engineering bespoke design agreed by Building Control
	Boundary between attached properties (soffit eaves junction, party wall to external wall cavity junctions, horizontal junction between party floors)				
	Internal wall cavity termination at openings				
	Internal boundary between attached properties (party wall floor and roof junctions)				
FIRE STOPPING	External fire resistance envelope imperfections (around openings, relevant service penetrations)	Completion of the fire resistance envelope to at least the time period for integrity and insulation of the envelope e.g. EI 30 or 60	To present justification and drawing on the location and specification	Building Designer ¹	Compliant to the Statutory Guidance
	Internal fire resistance envelope imperfections (compartmentation wall and floor junctions, relevant service penetrations, spandrel panel to roof finishes, roof soffit junction between attached buildings)				

NOTE 1: Building Designer is the term used in this document to define the party responsible for the project overall design and who is managed by the Principal Designer or is the Principal Designer. Specialist companies may be engaged and contracted to provide design specifics for part or all of the cavity barrier and or fire stopping details. The coordination of bespoke or parts of the design rests with the Principal Designer. For fire stopping to service penetrations there is to be coordination with the services designers.

Structural Timber Frame Building System supplier may provide a design service, but it is not advisable unless they are providing the façade or roof finishes. The follow-on trade that closes in or creates the fire resistance outer envelope has a responsibility and accountability to ensure the function of the products attached to the fire resistance envelope is to the design so it is relevant that the fire resistant envelope designer is responsible for the design and specification for which the building designer will have overall sight of the different specialist parts of the building to ensure it is co-ordinated.

If a Structural Timber Frame Building System supplier provides a design service coordination and cooperation of the other parties to the building design is needed to ensure the design is suitable for the project. This coordination role is not suited to the Structural Timber Frame Building System supplier and the Principal Designer shall consider how the process will be managed with a discrete designer function such as the Structural Timber Frame Building System supplier.

THE STRUCTURAL TIMBER FRAME BUILDING SYSTEM SUPPLIER IS NOT THE BUILDING DESIGNER.



3.2 RRA for supply

SUBJECT	LOCATION	FUNCTION	ROLE	RESPONSIBILITY	ACCOUNTABILITY
CAVITY BARRIER	External envelope = through the wall assembly (façade cavity to structural frame and internal service void, roof eaves to external wall, floor to external wall interface and termination of external wall cavities)	To close off cavities so to inhibit hot smoke and fire spread within relevant cavity compartments	To present justification and drawing on the location and specification	Building Designer ¹	Compliant to the Statutory Guidance OR BS9991/ BS9999 OR Fire engineering bespoke design agreed by Building Control
	Boundary between attached properties (soffit eaves junction, party wall to external wall cavity junctions, horizontal junction between party floors)				
	Internal wall cavity termination at openings				
	Internal boundary between attached properties (party wall floor and roof junctions)				
FIRE STOPPING	External fire resistance envelope imperfections (around openings, relevant service penetrations)	Completion of the fire resistance envelope to at least the time period for integrity and insulation of the envelope e.g. EI 30 or 60	To present justification and drawing on the location and specification	Building Designer ¹	Compliant to the Statutory Guidance
	Internal fire resistance envelope imperfections (compartmentation wall and floor junctions, relevant service penetrations, spandrel panel to roof finishes, roof soffit junction between attached buildings)				

NOTE 1: Building Designer is the term used in this document to define the party responsible for the project overall design and who is managed by the Principal Designer or is the Principal Designer. Specialist companies may be engaged and contracted to provide design specifics for part or all of the cavity barrier and or fire stopping details. The coordination of bespoke or parts of the design rests with the Principal Designer. For fire stopping to service penetrations there is to be coordination with the services designers.

Structural Timber Frame Building System supplier may provide a design service, but it is not advisable unless they are providing the façade or roof finishes. The follow-on trade that closes in or creates the fire resistance outer envelope has a responsibility and accountability to ensure the function of the products attached to the fire resistance envelope is to the design so it is relevant that the fire resistant envelope designer is responsible for the design and specification for which the building designer will have overall sight of the different specialist parts of the building to ensure it is co-ordinated.

If a Structural Timber Frame Building System supplier provides a design service coordination and cooperation of the other parties to the building design is needed to ensure the design is suitable for the project. This coordination role is not suited to the Structural Timber Frame Building System supplier and the Principal Designer shall consider how the process will be managed with a discrete designer function such as the Structural Timber Frame Building System supplier.

3.3 RRA for installation

IMPORTANT: If one side of the proposed cavity is not present when installing a cavity barrier product, it is not deemed to be a functioning cavity barrier, rather just a cavity barrier product. The accountability for its compliance rests with the installer of the final element of the cavity.

SUBJECT	LOCATION	FUNCTION	ROLE	RESPONSIBILITY	ACCOUNTABILITY
CAVITY BARRIER	External envelope = through the wall assembly (façade cavity to structural frame and internal service void, roof eaves to external wall, floor to external wall interface and termination of external wall cavities)	To close off cavities so to inhibit hot smoke and fire spread within relevant cavity compartments	To fit specified cavity barrier to drawing locations and to appropriate installation instructions and tolerances To stop work and highlight discrepancies in design to as built	Contract agreement on installer. Contract Type CBFS-B ¹ - structural timber framer OR Contract Type CBFS-A ¹ façade or specialist installer <i>Noting that if installed to the structural frame before the façade is built to create the cavity then this is not a functioning cavity barrier and clear contract scope of responsibility of the finished functioning cavity barrier is to be allocated to the façade installer</i>	Contract Type CBFS-B ¹ - structural timber framer Company site safe audit and sign off for the as installed products against the structural frame only STA install care point ² sign off OR Contract Type CBFS-A ¹ façade or specialist installer Façade install care point ² sign off Principal Contractor sign ² off that function of the cavity barrier is complete to design and specifications
	Boundary between attached properties (soffit eaves junction, party wall to external wall cavity junctions, horizontal junction between party floors)				
	Internal wall cavity termination at openings				
	Internal boundary between attached properties (Party wall floor and roof junctions)				
FIRE STOPPING	External fire resistance envelope imperfections (around openings, relevant service penetrations)	To continue the fire resistance envelope	To fit specified fire stopping to drawing locations and to appropriate installation instructions and tolerance. To stop work and highlight discrepancies in design to as built. To stop work and highlight discrepancies in design to as built	Contract agreement on installer. Contract Type CBFS-B ¹ - structural timber framer for elements present during the structural timber framers' presence on site OR Contract type CBFS-A ¹ façade or specialist installer	Principal Contractor ² signs off that function of the fire stopping is complete to design and specifications
	Internal fire resistance envelope imperfections (compartmentation wall and floor junctions, relevant service penetrations, spandrel panel to roof finishes, roof soffit junction between attached buildings)				

NOTE 1: Two options are presented in Part 6 for contract agreement on the installation of cavity barriers and fire stopping.

NOTE 2: See part 6 for sign off procedures and care points.

Contract Type CBFS-A

Where design, supply and installation of cavity barriers or fire stopping is not provided by the Structural Timber Building System supplier. The services are provided by others.

Contract type CBFS-B

Specific services are to be agreed to be provided by the Structural Timber Building System supplier. For example:

SPECIFIC SERVICE BY THE STRUCTURAL TIMBER BUILDING SYSTEM SUPPLIER	DESIGN	SUPPLY	INSTALL
Location 1 (define)	Yes / No	Yes / No	Yes / No
Location 2	Yes / No	Yes / No	Yes / No
ETC	Yes / No	Yes / No	Yes / No

Contract type CBFS-C

Specialist installer responsible for the façade or fire envelope finishes undertakes the following:

SPECIFIC SERVICE BY THE SPECIALIST INSTALLER	DESIGN	SUPPLY	INSTALL
Location 1 (define)	Yes / No	Yes / No	Yes / No
Location 2	Yes / No	Yes / No	Yes / No
ETC	Yes / No	Yes / No	Yes / No

NOTE: The specialist installer may not be the same as the structural timber building system supplier.

4. Cavity barrier locations

4.1 Background to locations and details

The functional requirements and regulation guidance requirements for cavity barriers is presented in Part 2 of this document. In determining the location of any cavity barrier, the designer (Principal/Building Designer) shall ensure that the detail will close a cavity at its boundary and to sub divide a length and width of an excessive cavity.

The boundary of a cavity is where it ceases to be a cavity in that member or where a hole or other aperture is formed such as doorways and windows. Cavity barriers are present where holes occur and enter the cavity as the hole forms a new boundary in the relevant wall or ceiling.

Concept details for each junction is covered in Part 4 of this document. The installation of the Cavity Barriers can be agreed in the contract. Part 2 provides a list of responsibilities that can be agreed.

The STA recommend that if the cavity barriers are not to be installed by a STA Structural Building System member, for example installed instead by a cladding contractor, then the guidance in the STA documents should be followed and signed off by the installer as noted in Part 5.

4.2 Cavity barrier locations



Sub-divide extensive cavities

STA consider that for combustible cavities subdivision shall be 10m in multi occupancy dwellings and 20m for Euroclass A1/A2/B sheathing exposed to the cavity and where the breather membrane does not contribute to the fire. In this document the STA recommend the approach taken by the Scottish building process as an example of a resilient solution which can also be adopted in England, Wales and Northern Ireland. However, the Building Designer can still adopt the minimum levels of installation in regions outside of Scotland with appropriate quality control as such solutions have a history of compliance when built correctly.

Cavity barrier below DPC level

The guidance documents to the regulations do not explicitly explain what to do below the DPC line or to the below ground cavity to external walls. The STA recommends that following a review of the regulations and considering the impact of concern relating to fire spread and combustible framing, that the inclusion of cavity barriers below DPC lines has been a recommendation for projects from September 2020. The responsibility for installing the cavity barrier below DPC is not the structural timber building supplier, but rests with the Building Designer for details and ground work contractor for installation.

Cavity barriers around meter cupboards

The STA recommend that all meter cupboards have a cavity barrier around them, unless there is an inherent cavity barrier in the construction of the service cupboard.

Cavity barriers to service penetrations

The STA recommend that service penetrations should have a cavity barrier and relevant fire stopping. The cavity barrier function may be provided by non-combustible sleeves/conduits.

Cavity barriers to cladding penetrations

Penetrations such as sub-floor ground ventilation grills and ducting should have a cavity barrier installed over them, or be constructed using a non-combustible material. Weep vents are acceptable and not considered to be a fire spread risk.

Key to cavity barrier and fire stopping locations for pages 25 - 52

- Standard cavity barrier
- - - Fire stopping cavity barrier
- - - Below DPC cavity barrier

ISTA Location not specific in guidance but is recommended as resilient practice by the STA

D = Good practice concept detail in Part 5 of this document
e.g. D12 = DETAIL 12

4.3 STA good practice locations



Example shown is a domestic building; principles apply to other types of building.

IMPORTANT: All cavity barriers and fire stopping to be agreed in the contract as to who is responsible for the design and installation.

KEY:

- E = external wall
- PW = party wall
- CB = cavity barrier
- FS = fire stopping

4.3.1 Locations for resilience⁵; single dwelling

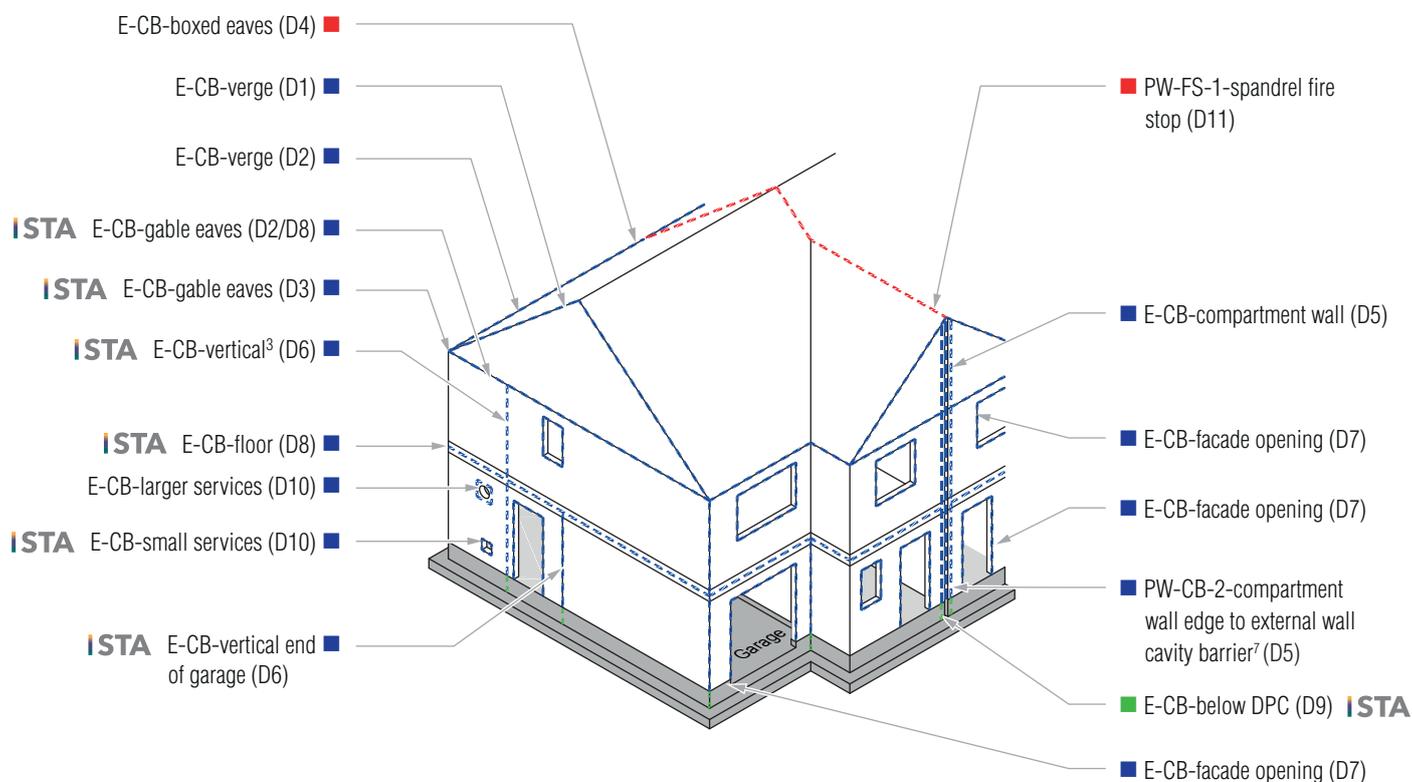


Figure 4.1: External weather facade to structural timber frame¹ cavity barrier locations⁴; single dwelling structure with uninhabited pitch roof space²

NOTES:

- ¹ 'Facade' covers all forms from masonry, masonry slip elements, render boards, lightweight cladding boards and timber cladding. However some cladding types⁶ such as open facade cladding, steel plates and open board designs may require additional cavity barriers, subject to the designer's answer to satisfy the fire safety strategy.
- ² For flat roofs follow same principles for room in the roof. Consider the insulated roof portion as a storey level condition for cavity barriers and fire stopping.
- ³ Vertical cavity barriers required at 10m centres for wood-based structural elements, typically at corners for convenience, but it is not essential to have the vertical barriers at corners.
- ⁴ Except for the STA resilient details (indicated by **ISTA**) these are common and standard solutions in Scotland and Northern Ireland.
- ⁵ Details comply with common practice in Scotland and historically what was openly described in the Scottish Building Standards. To avoid confusion the STA recommend adoption across all parts of the UK, but there are currently acceptable reductions in statutory guidance. See Figure 4.5.
- ⁶ Cladding types other than minimum 90mm masonry leaf for houses may require fire protection to the gable panel itself to ensure stability during a fire condition for 30 minutes duration. This guidance does not address boundary conditions or fire resistance requirements and the Principal Designer should seek guidance elsewhere.
- ⁷ Cavity barrier needed to seal off the end of the party wall for airtightness in filled cavity spaces and cavity barrier needed to provide compliance in unfilled cavity spaces.

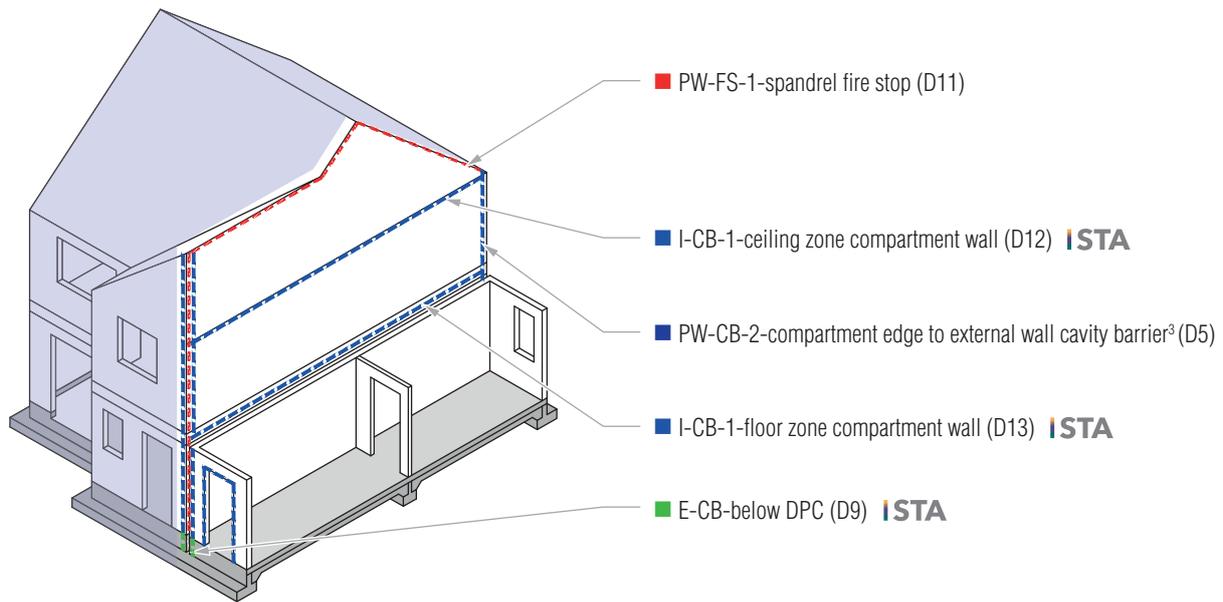


Figure 4.2: Internal frame compartment wall between dwellings that includes a cavity; single dwelling structure with uninhabited pitch roof space²

NOTES:

- 1 I-CB-1 locations must be undertaken by the structural timber building frame installer.
- 2 For flat roofs follow same principles for room in the roof. Consider the insulated roof portion as a storey level condition for cavity barriers and fire stopping.
- 3 Cavity barrier needed to seal off the end of the party wall for airtightness in filled cavity spaces and cavity barrier needed to provide compliance in unfilled cavity spaces.



Party walls are to have fire resistance compartmentation to the full height of the wall and up to the underside of the roof finishes. Fire resistance is to continue through floor zone.

The top of the timber frame wall will require a fire stop, not a cavity barrier.

Full filled party walls result in the cavity being filled and the void not being present. To ensure compliance with thermal regulations at the junction of an external wall and to close off even a filled cavity space, there is to be a cavity barrier suitable for the cavity width and timber-to-timber cavity junction.

Cavity barriers may be installed at floor levels for water durability protection to a full filled cavity in party walls.

4.3.2 Locations for resilience; multi occupancy

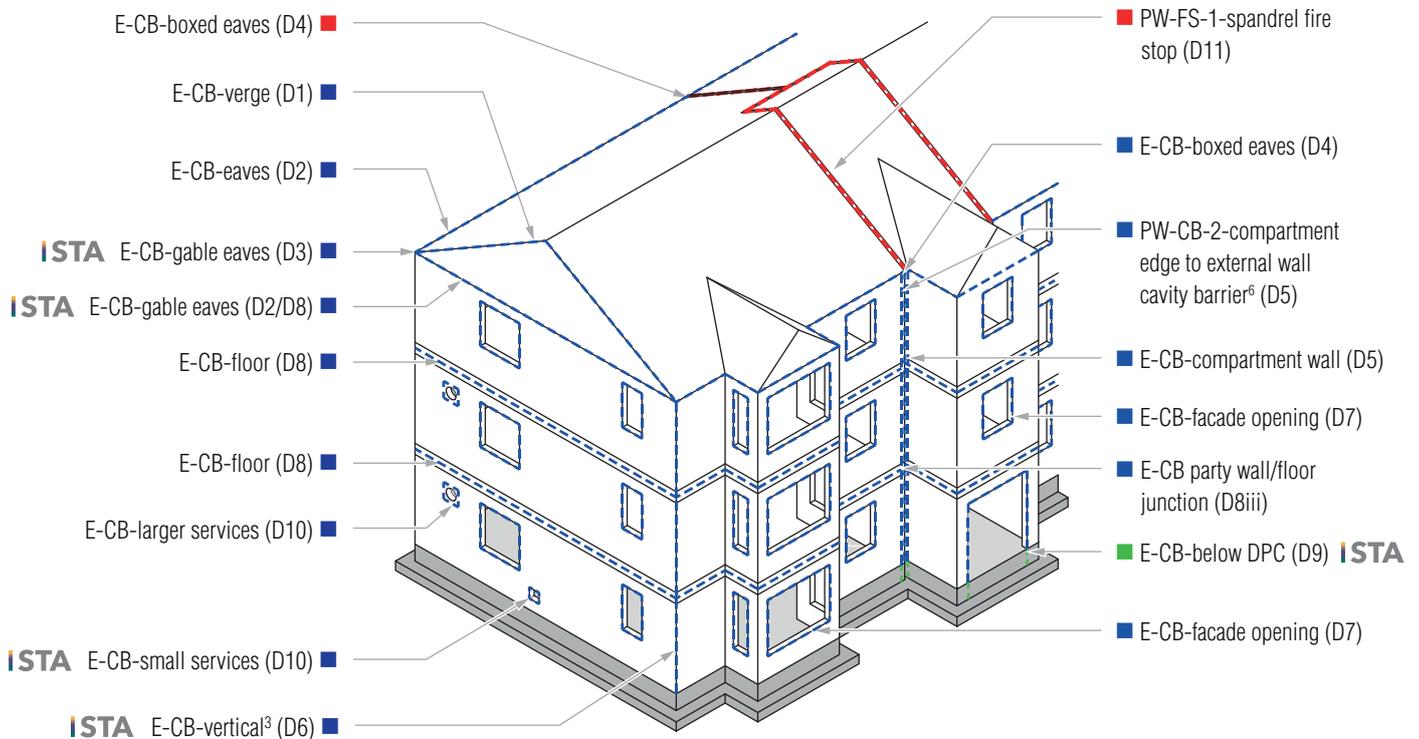
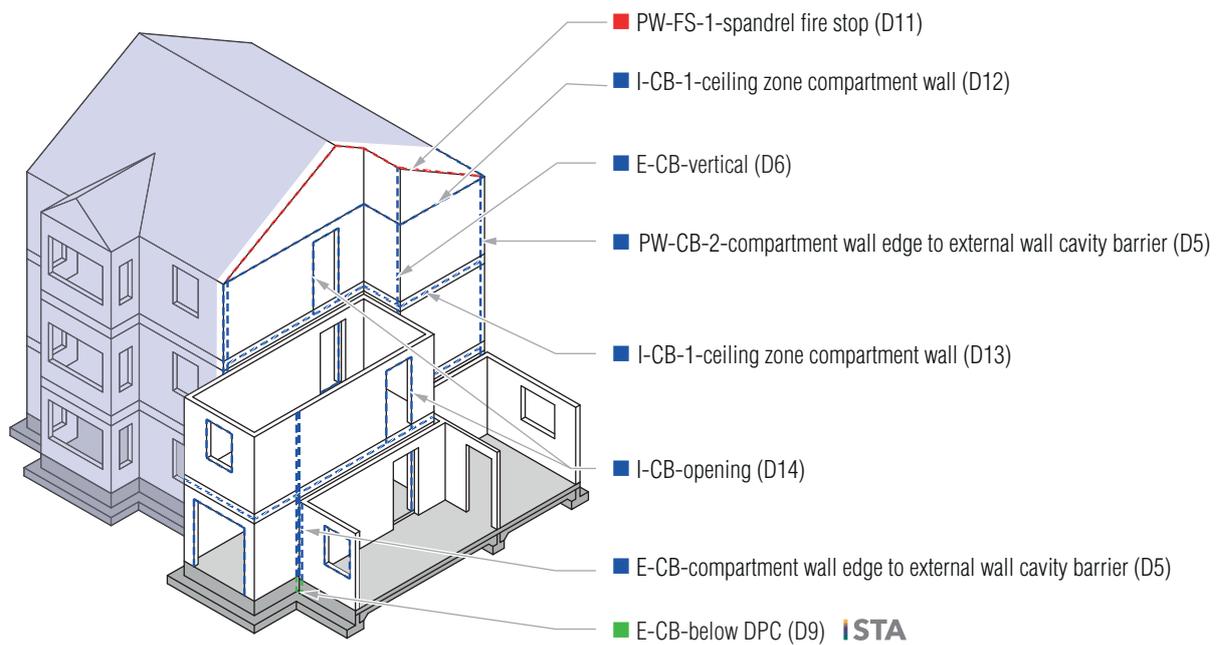


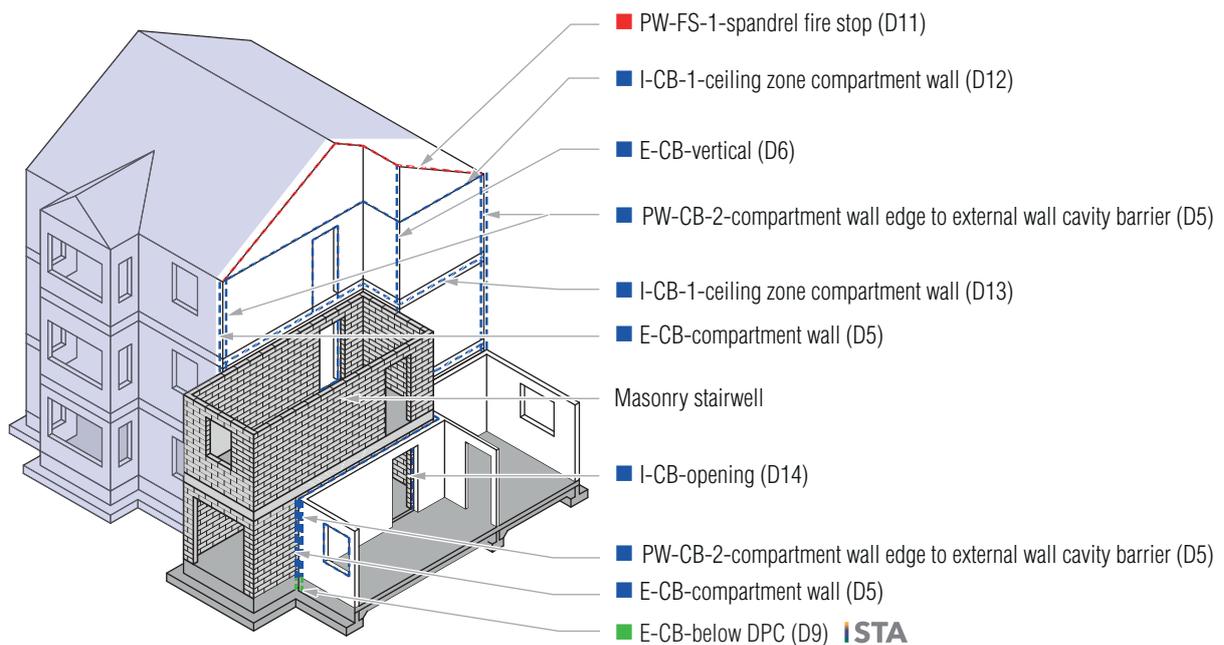
Figure 4.3: External weather facade to structural timber frame cavity barrier locations^{2,4}: resilience solution for multi-occupancy dwelling

NOTES:

- 1 'Facade'5 covers all forms from masonry, masonry slip elements, render boards, lightweight cladding boards and timber cladding. However some cladding types such as open facade cladding, steel plates and open board designs may require additional cavity barriers, subject to the designer's answer to satisfy the regulation requirements.
- 2 For flat roofs follow same principles for room in the roof. Consider the insulated roof portion as a storey level condition for cavity barriers and fire stopping.
- 3 Vertical cavity barriers required at 10m centres for wood-based structural elements exposed in the cavity, typically at corners for convenience, but it is not essential to have the vertical barriers at corners.
- 4 Except for the STA resilient details (indicated by **ISTA**) these are common and standard solutions in Scotland, Northern Ireland, Wales and England.
- 5 Facade types may require fire protection to the gable panel itself to ensure stability during a fire condition for the building classification duration. This guidance does not address boundary conditions or fire resistance requirements and the Principal Designer should seek guidance elsewhere.
- 6 Cavity barrier needed to seal off the end of the party wall for airtightness in filled cavity spaces and cavity barrier needed to provide compliance in unfilled cavity spaces.



a. Full structural timber



b. Structural timber with concrete/masonry common areas

Figure 4.4: Internal frame compartment wall between dwellings and common areas that include a cavity



Party walls are to have fire resistance compartmentation to the full height of the wall and up to the underside of the roof finishes. Fire resistance is to continue through floor zone.

The top of the timber frame wall will require a fire stop, not a cavity barrier.

Full filled party walls result in the cavity being filled and the void not being present. To ensure compliance with thermal regulations at the junction of an external wall and to close off even a filled cavity space, there is to be a cavity barrier suitable for the cavity width and timber-to-timber cavity junction.

Cavity barriers may be installed at floor levels for water durability protection to a full filled cavity in party walls.

4.3.3 Locations for common acceptance to Statutory Guidance compliance⁵ in England and Wales; single dwelling

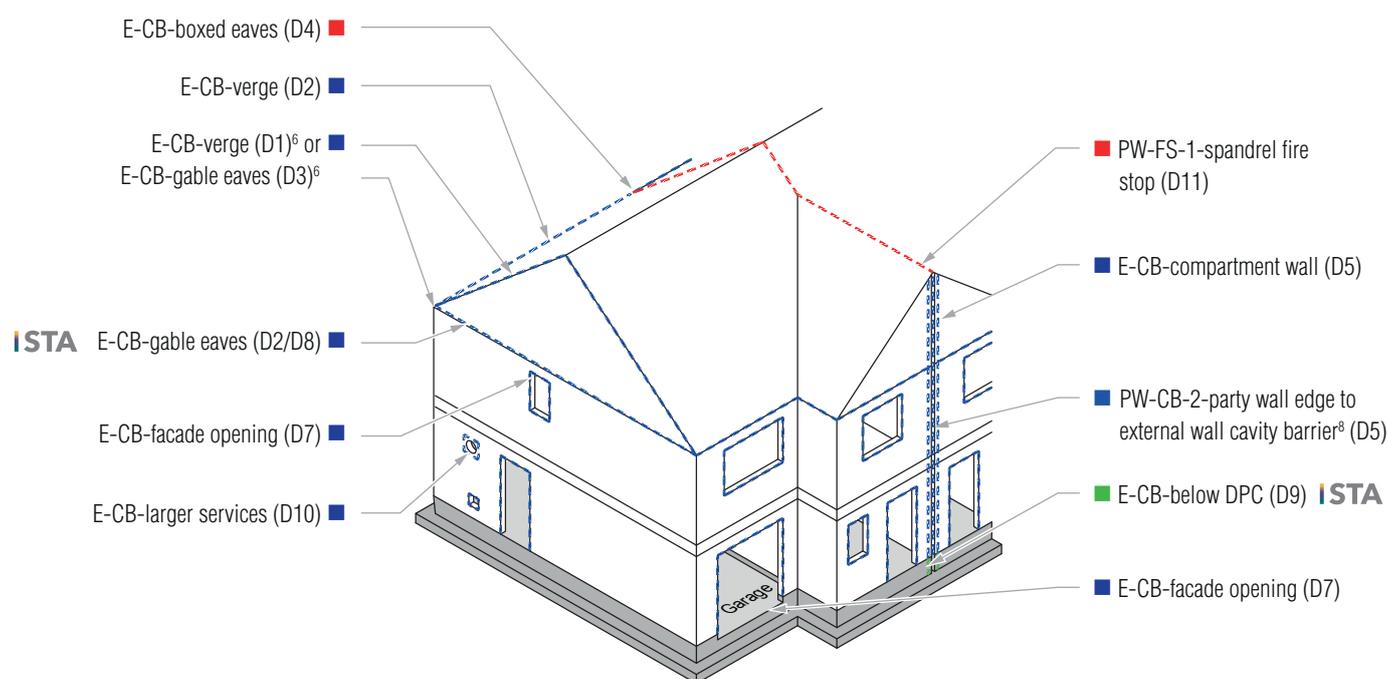


Figure 4.5: External weather facade to structural timber frame¹ cavity barrier locations²; single dwelling England and Wales guidance⁵ compliance (cold roof only)

NOTES:

- 1 'Facade' covers all forms from masonry, masonry slip elements, render boards, lightweight cladding boards and timber cladding. However some cladding types⁷ such as open facade cladding, steel plates and open board designs may require additional cavity barriers, subject to the designer's answer to satisfy the regulation requirements.
- 2 For flat roofs follow same principles for room in the roof. Consider the insulated roof portion as a storey level condition for cavity barriers and fire stopping.
- 5 Minimum level of cavity barrier installation commonly adopted to comply (except for those marked **ISTA**) with current building regulation Statutory Guidance in England and Wales as of December 2022. Checks must be made to determine if updates are in place for Wales and England since the publication of this document.
- 6 The STA follow the Scottish approach to cavity barrier locations. England and Wales statutory guidance advises that external wall cavities are to be closed off at the ends. To close off a gable panel following the verge line complies with this requirement. Its purpose at this location is considered to stop the draw of air up the gable panel. The vulnerable cavity location is below the ceiling line for cold roofs; above the eaves line there is an uninsulated gable frame providing stability to the masonry cladding with no service penetrations. Therefore, the option to close off at the eaves/ceiling line in place of the verge line is considered to fulfill the functional requirements; to more effectively stop air draw in the vulnerable cavity adjacent to habitable space and to provide a barrier to fire spread into the roof space via the uninsulated and unprotected gable panel. However, third party checking authorities may be looking to apply the strict description of statutory guidance and want the verge cavity barrier regardless; the Principal Designer should ensure third party approval checkers will approve on technical grounds the ceiling line cavity barrier only.
- 7 Cladding types other than minimum 90mm masonry leaf for houses may require fire protection to the gable panel itself to ensure stability during a fire condition for 30 minutes duration. This guidance does not address boundary conditions or fire resistance requirements and the Principal Designer should seek guidance elsewhere.
- 8 Cavity barrier needed to seal off the end of the party wall for airtightness in filled cavity spaces and cavity barrier needed to provide compliance in unfilled cavity spaces.

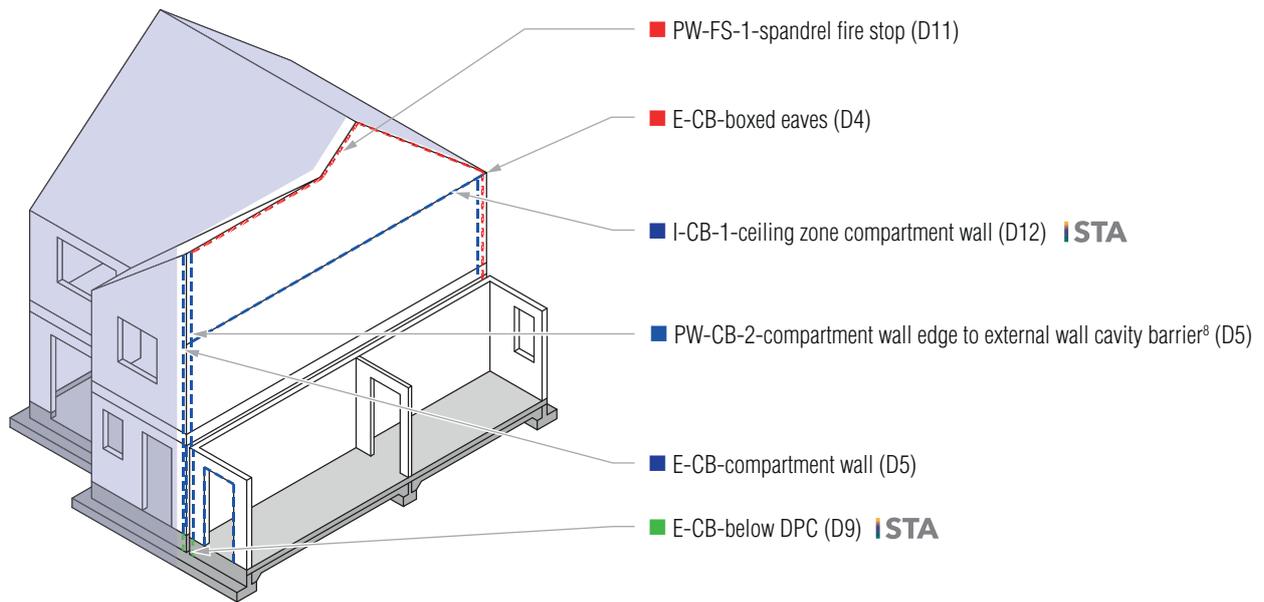


Figure 4.6: Internal frame compartment wall between dwellings that include a cavity; single dwelling England and Wales compliance only

NOTES:

Cavity barrier ceiling to roof, if adopted, must be undertaken by the structural timber building contractor. All other cavity barriers and fire stops to be agreed in the contract as to who is responsible for the design and installation.

- 5 Minimum level of cavity barrier installation commonly adopted to comply (except for those marked **ISTA**) with current building regulation Statutory Guidance in England and Wales as of December 2022. Checks must be made to determine if updates are in place for Wales and England since the publication of this document.
- 8 Cavity barrier needed to seal off the end of the party wall for airtightness in filled cavity spaces and cavity barrier needed to provide compliance in unfilled cavity spaces.



Party walls are to have fire resistance compartmentation to the full height of the wall and up to the underside of the roof finishes. Fire resistance is to continue through floor zone.

The top of the timber frame wall will require a fire stop, not a cavity barrier.

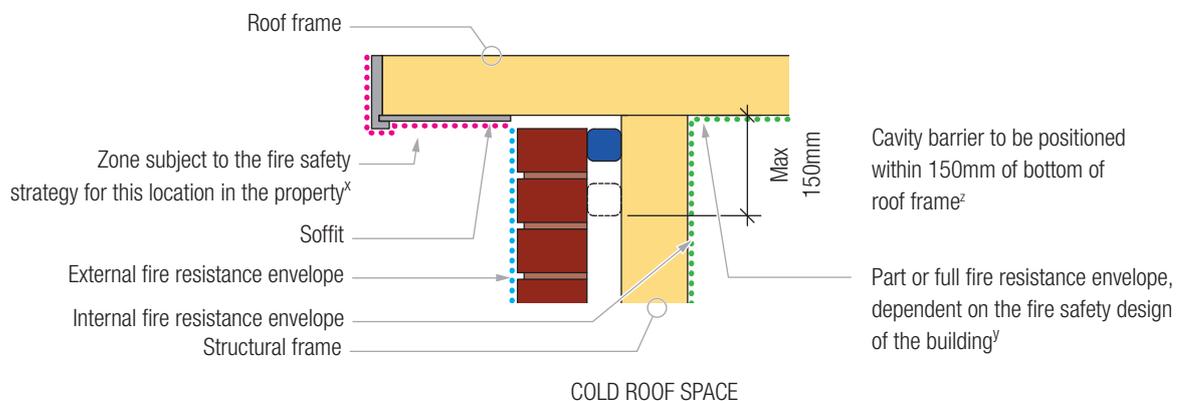
Full filled party walls result in the cavity being filled and the void not being present. To ensure compliance with thermal regulations at the junction of an external wall and to close off even a filled cavity space, there is to be a cavity barrier suitable for the cavity width and timber-to-timber cavity junction.

Cavity barriers may be installed at floor levels for water durability protection to a full filled cavity in party walls.



5. Good practice concept details

D1: E-CB-verge



DRAWING NOTES:

x Each property to have a fire safety strategy for the development. See Advice Note 7.3 where fire resistance envelope extends to the roof (e.g. room in the roof), then the soffit may need to be designed to have EI fire resistance matched to the building requirement.

y Standard house design (2 storey) commonly does not have fire resistance requirement for the roof as this allows fire to ventilate and reduce the temperature from a compartment fire. The fire resistance envelope therefore ends at the top of the wall. In practice the plasterboard ceiling provides some fire resistance but not to the compartment standard.

z In general, the cavity barrier shall have solid timber backing it. For locations at eaves where the cavity barrier is below the frame plates the cavity barrier will not be backed by solid timber. This arrangement has been tested and achieves EI 30/15 when the frame has glass wool insulation or PIR directly behind the 9mm osb board.

D1: Section through verge

DETAIL NOTES:

Drylining and insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

Movement joint at interface of masonry cladding and soffit, note this may need to be fire stopped (fire mastic) at a boundary condition

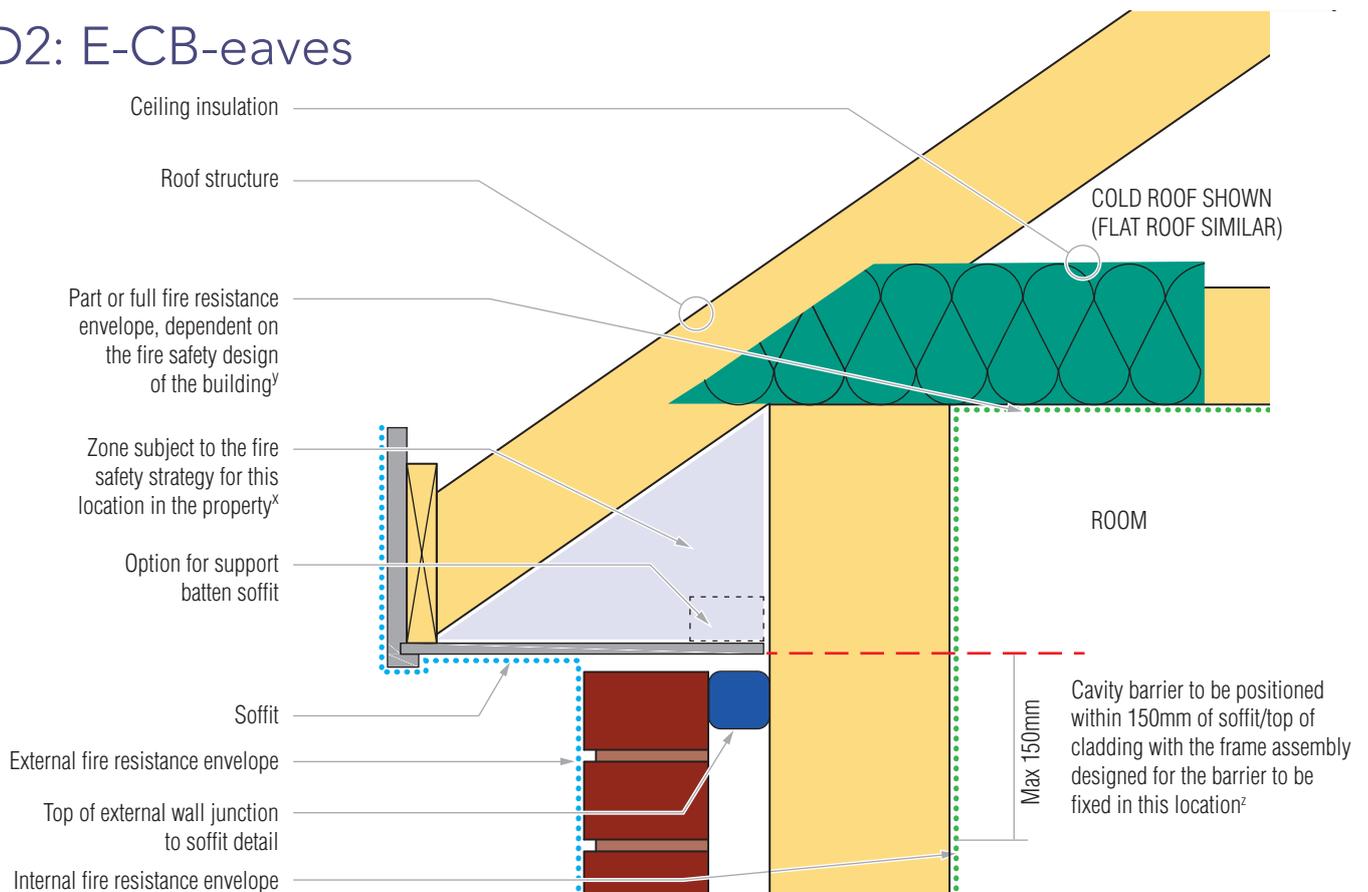
Sheathing omitted for clarity (or may not be required)

The cavity barrier with 9mm timber sheathing and glass wool or PIR against the sheathing board in this location (only) does not need solid timber backing

DETAIL INTENTION:

To close off the airflow in the event of a fire at the top of the cavity in the external wall.

D2: E-CB-eaves



DRAWING NOTES:

x, y See section 2.1 for the accompanying notes regarding fire safety strategy and fire resistance envelope.

z In general, the cavity barrier shall have solid timber backing it. For locations at eaves where the cavity barrier is below the frame plates the cavity barrier will not be backed by solid timber. This arrangement has been tested and achieves EI 30/15 when the frame has glass wool insulation or PIR directly behind the 9mm osb board.

D2i: Section through verge at eaves

DETAIL NOTES:

Warm roofs with potentially habitable space require a review of fire spread into the habitable space and cavity barriers will require backing such as solid timber or other justification to ensure the fire does not bypass the cavity barrier function

Drylining and wall insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

Movement joint at interface of masonry cladding and soffit, note this may need to be fire stopped (fire mastic) at a boundary condition

At above window locations the design of the building may require the soffit board to have a fire resistant function (typically for multi-storey care homes). This may also provide the function of cavity barrier subject to the cladding detail. Design details for roof ventilation to be considered.

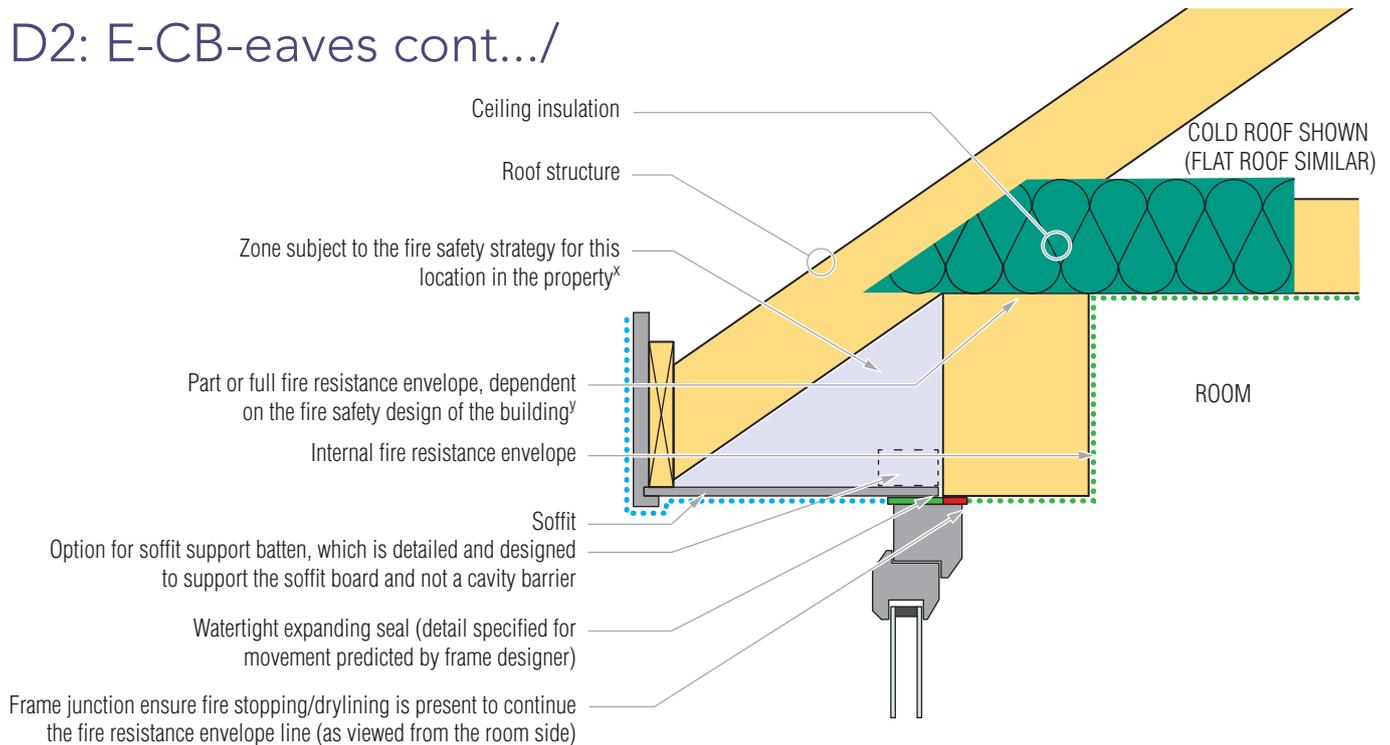
Sheathing omitted for clarity (or may not be required)

The cavity barrier with 9mm timber sheathing and glass wool or PIR against the sheathing board in this location (only) does not need solid timber backing

DETAIL INTENTION:

For cold roofs and flat roofs, to close off the airflow in the event of a fire at the top of the cavity in the external wall. For warm roofs with potentially habitable space, the cavity barrier is to inhibit spread of fire. The detail does not address warm roofs, this is to be detailed to the same principles as a floor level cavity barrier.

D2: E-CB-eaves cont.../



DRAWING NOTES:

x, y See page 25 for the accompanying notes regarding fire safety strategy and fire resistance envelope.

D2ii: Section through verge if window is at eaves level

DETAIL NOTES:

Thermal performance to be verified by designer

Warm roofs with potentially habitable space require a review of fire spread into the habitable space and cavity barriers will require backing such as solid timber or other justification to ensure the fire does not bypass the cavity barrier function. The Building Designer will need to consider fire spread through a soffit under a window condition as part of their fire safety design, in which case soffits may be non-combustible A1/A2 boards or timber boarding of suitable depth (to be fire engineered)

Drylining and wall insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

Movement joint at interface of masonry cladding and soffit, note this may need to be fire stopped (fire mastic) at a boundary condition

At above window locations the design of the building may require the soffit board to have a fire resistant function (typically for multi-storey care homes). This may also provide the function of cavity barrier subject to the cladding detail

Intumescent products to be tested for this application; but due to size of the opening they are not likely to be appropriate. At above window locations the design of the building may require the soffit board to have a fire resistant function (typically for multi-storey care homes). This may also provide the function of cavity barrier subject to the cladding detail. Design details for roof ventilation to be considered

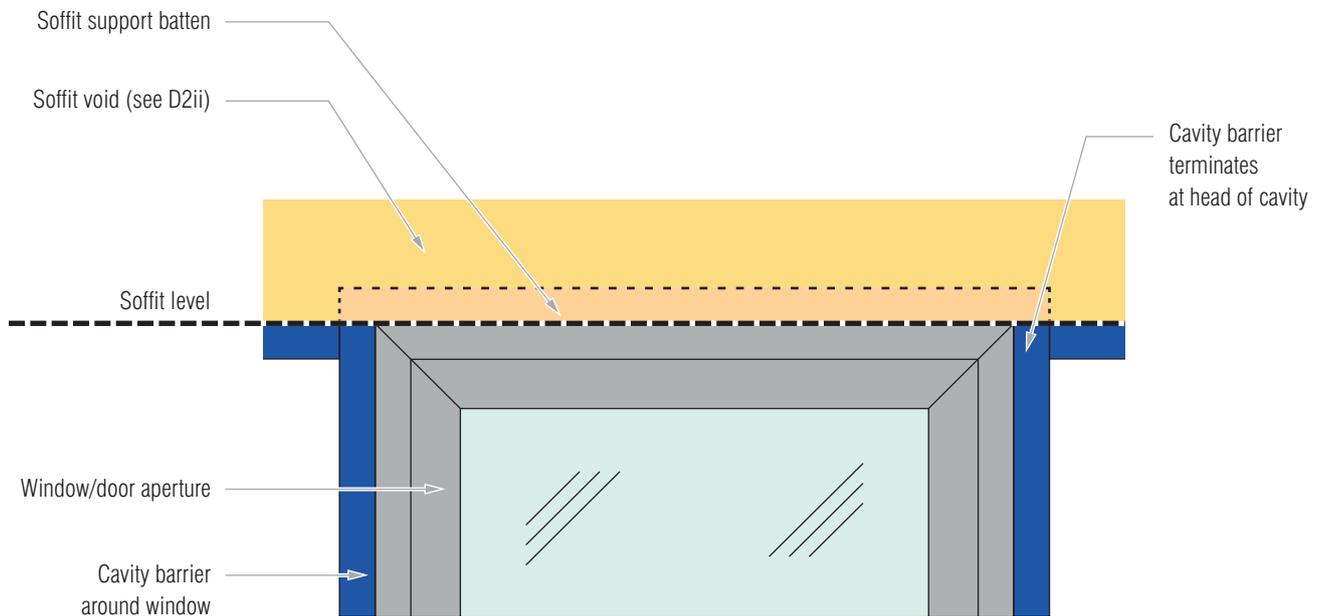
DETAIL INTENTION:

The detail is not technically a cavity to an external wall. The soffit space at eaves level presents a challenging condition for all material types as the space forms its own cavity. However, soffit spaces are part of a roof structure requiring ventilation. Fire in the soffit is vulnerable to habitable roofs spaces and such conditions require, in buildings where the roof is not part of the same dwelling occupancy at the lower level, consideration of non-combustible soffits regardless of the construction type.

For warm roofs with potentially habitable space, the cavity barrier is to inhibit spread of fire. The detail does not address warm roofs, this is to be detailed to the same principles as a floor level cavity barrier.

Soffits are to be considered by the Building Designer for fire safety and whilst not a cavity barrier, the use of an A1/A2 or 25mm thick solid timber may be required as part of the building's fire spread strategy.

D2: E-CB-eaves cont.../



D2iii: Elevation above window at soffit level

DETAIL NOTES:

Cold/warm roof structures

Drylining and insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

Cavity barriers around windows can turn to fire stopping (same fire resistance as walls) if the window location is such that there is a breach in the wall envelope line

Intumescent products to be tested for this application; but due to size of the opening they are not likely to be appropriate. At above window locations the design of the building may require the soffit board to have a fire resistant function (typically for multi-storey care homes). This may also provide the function of cavity barrier subject to the cladding detail

DETAIL INTENTION:

The detail is not technically a cavity to an external wall. The soffit space at eaves level presents a challenging condition for all material types as the space forms its own cavity. However, soffit spaces are part of a roof structure requiring ventilation. Fire in the soffit is

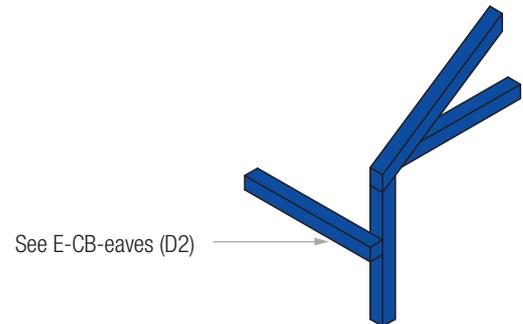
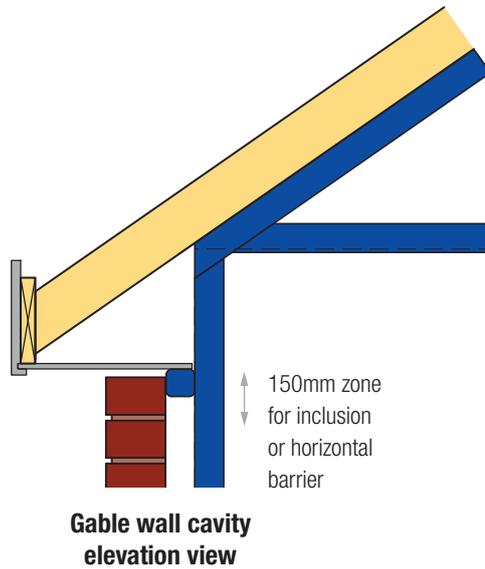
vulnerable to habitable roofs spaces and such conditions require, in buildings where the roof is not part of the same dwelling occupancy at the lower level, consideration of non-combustible soffits regardless of the construction type.

For warm roofs with potentially habitable space, the cavity barrier is to inhibit spread of fire. The detail does not address warm roofs, this is to be detailed to the same principles as a floor level cavity barrier.

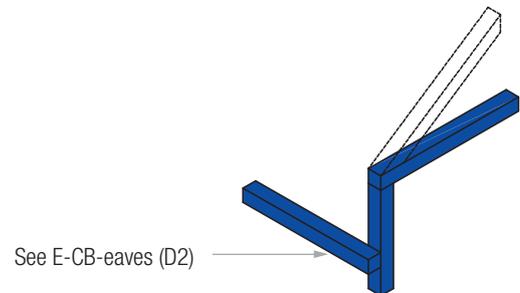
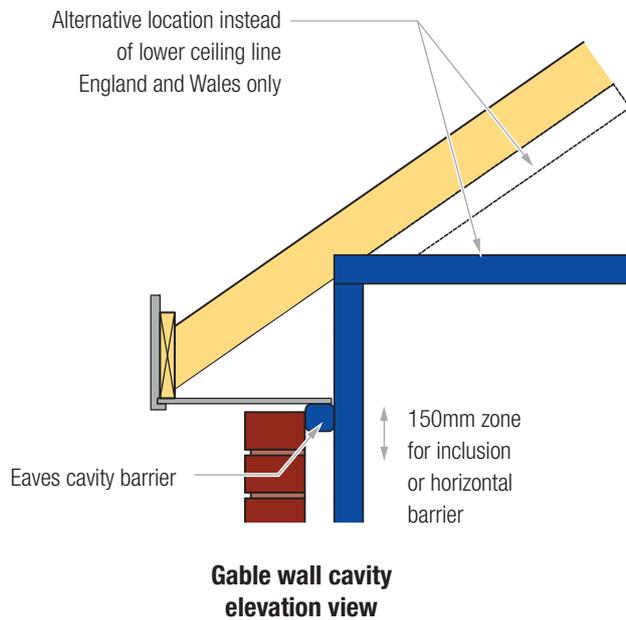
Soffits are to be considered by the Building Designer for fire safety and whilst not a cavity barrier, the use of an A1/A2 or 25mm thick solid timber may be required as part of the building's fire spread strategy.

D3: E-CB-gable eaves

RESILIENT SOLUTION



COMPLIANCE FOR ENGLAND & WALES



D3: Gable corner diagrammatic views of vertical and horizontal cavity barriers

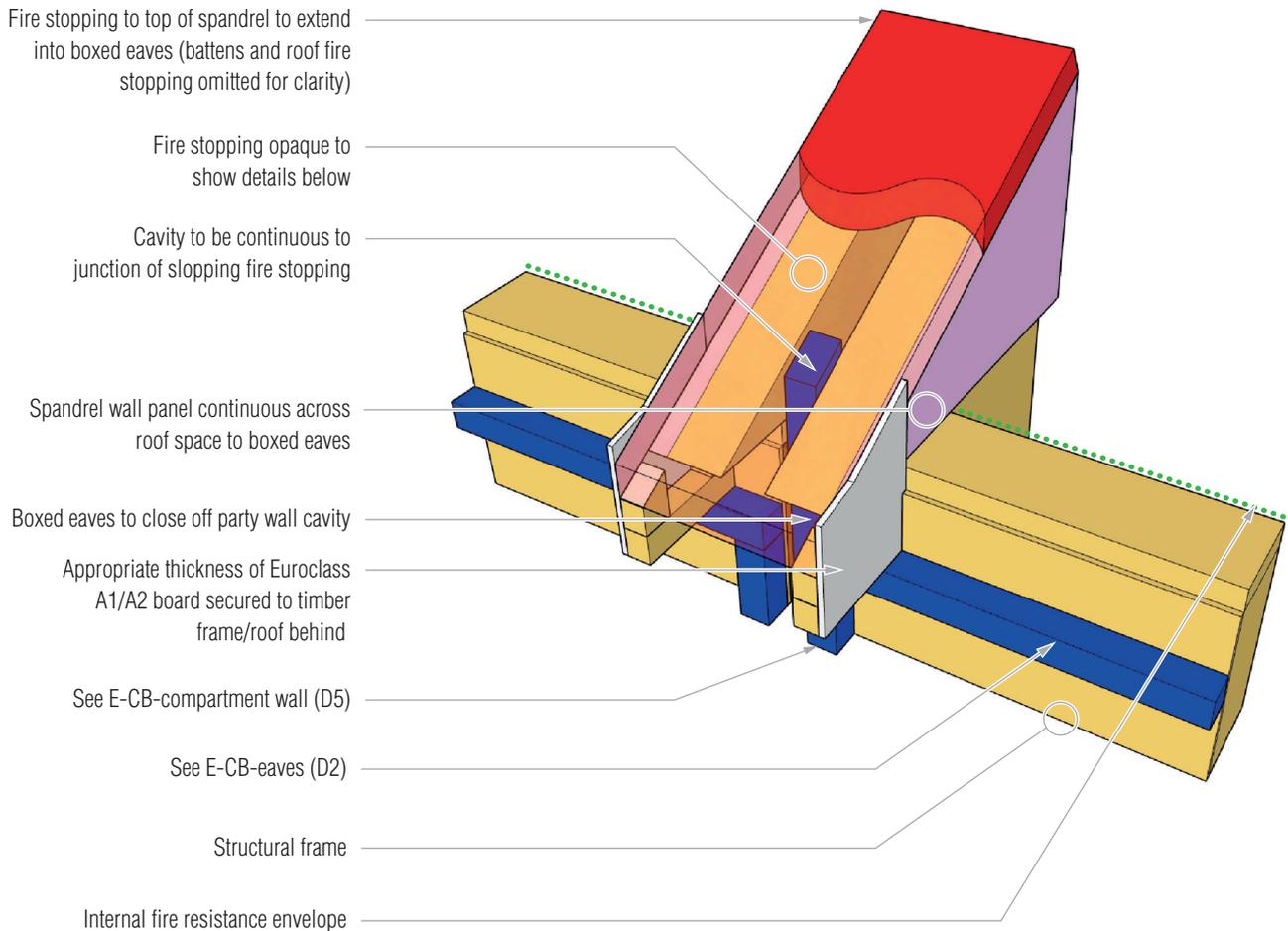
DETAIL NOTES:

All junctions to be butting

DETAIL INTENTION:

To create cavity enclosures bounded by cavity barriers. In the event of a fire in the cavity it is inhibited from spreading between enclosures.

D4: E-CB-boxed eaves



D4i: Isometric of rigid board boxed eaves at compartment wall (battens and roof fire stopping omitted for clarity)

DETAIL NOTES:

Cold/warm/flat roof structures

Drylining and insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

Intumescent products to be tested for this application and due to size of the opening not likely to be appropriate

At above window locations the design of the building may require the soffit board to have a fire resistant function (typically for multi-storey care homes). This may also provide the function of cavity barrier subject to the cladding detail

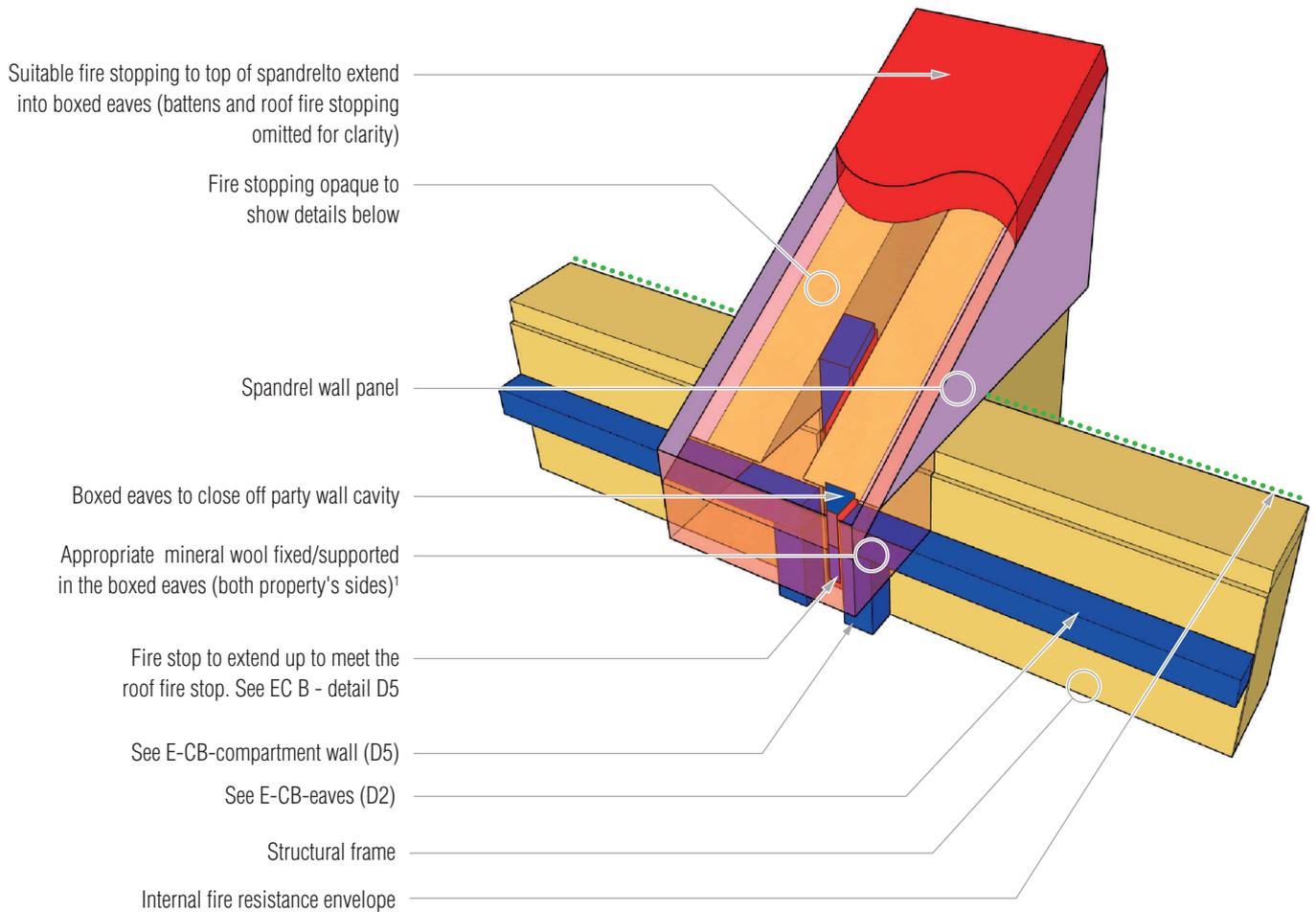
Propriety products with third party approval can be used in this detail

Where stepped and staggers occur ensure that the boxed eaves continue the fire barrier as shown in this linear application

DETAIL INTENTION:

To create barrier that stops the fire, in accordance with Statutory Guidance time requirements, spreading from one dwelling to the next through the cavity space at soffit level that abuts each dwelling.

D4: E-CB-boxed eaves cont.../



DRAWING NOTES:

- 1 Mineral wool is to be secured appropriately either by wire mesh or be wire reinforced mineral wool that can be fastened to the structural elements. The mineral wool is to stay in place should the soffits be taken away.

D4ii: Isometric of wire reinforced mineral wool boxed eaves at compartment wall (battens and roof fire stopping omitted for clarity)

DETAIL NOTES:

Cold and warm roof structures

Drylining and insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

Soffit board omitted for clarity

Fire stop to be continuous and gaps filled

Intumescent products to be tested for this application

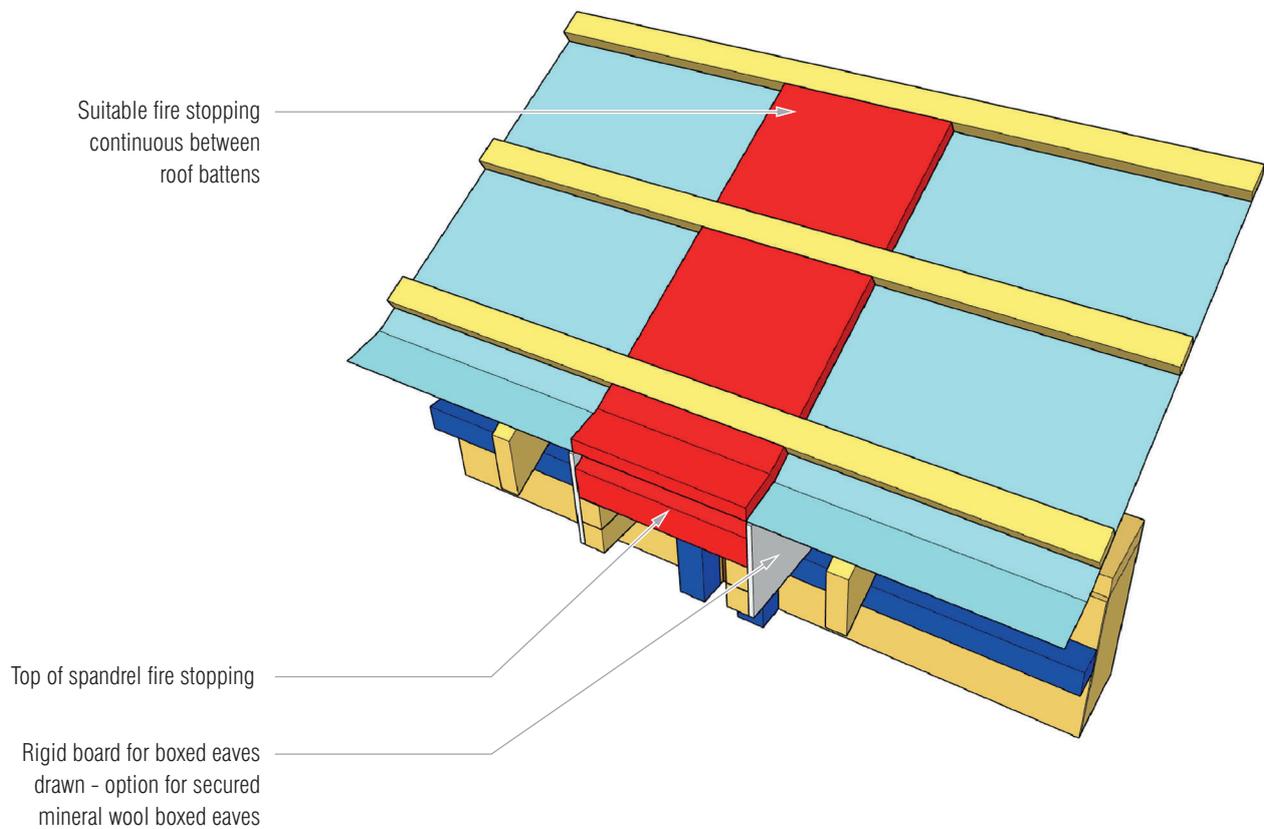
Proprietary products with third party approval can be used in this detail

Where stepped and staggers occur ensure that the boxed eaves continue the fire barrier as shown in this linear application

DETAIL INTENTION:

To create barrier that stops the fire, in accordance with Statutory Guidance time requirements, spreading from one dwelling to the next through the cavity space at soffit level that abuts each dwelling.

D4: E-CB-boxed eaves cont.../



D4iii: Isometric of fire stopping to continue into tiling battens (installation by roofing contractor)

DETAIL NOTES:

Cold and warm roof structures

Drylining and insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

Soffit board omitted for clarity

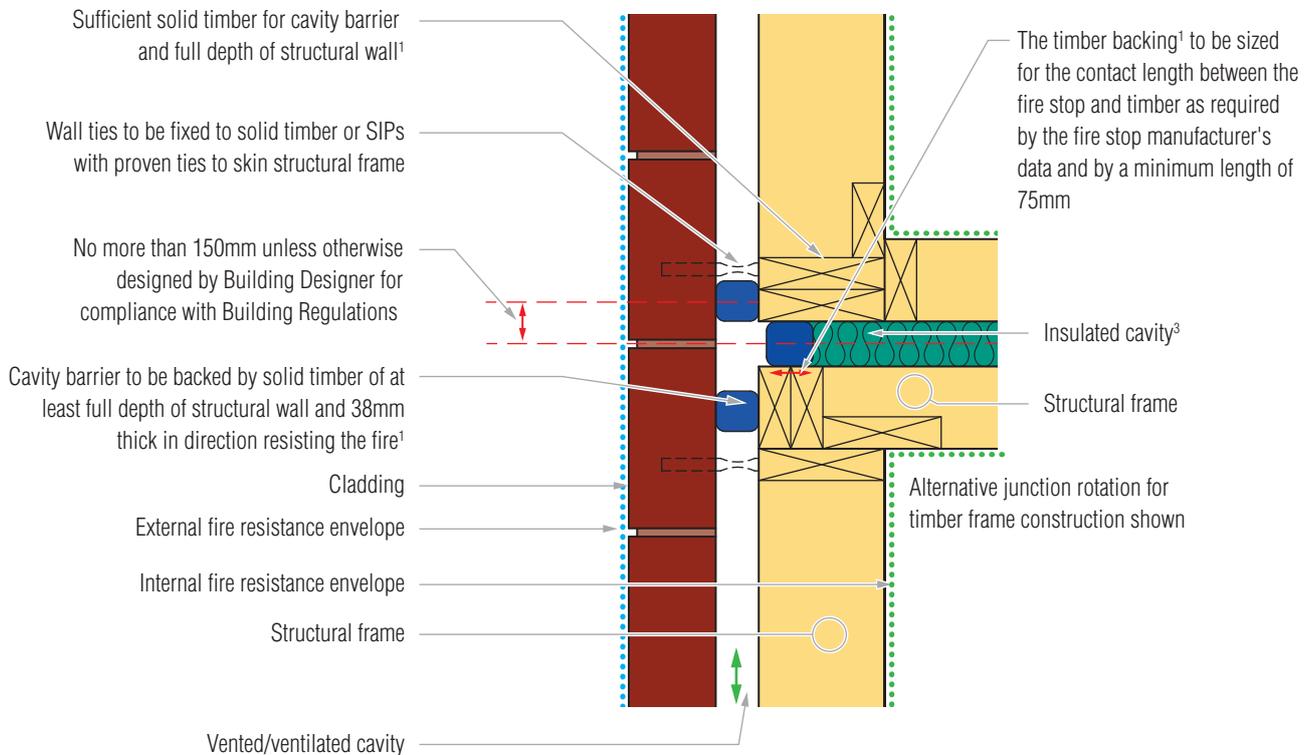
Intumescent products to be tested for this application

Where stepped and staggers occur ensure that the boxed eaves continue the fire barrier as shown in this linear application.

DETAIL INTENTION:

To create barrier that stops the fire, in accordance with Statutory Guidance time requirements, spreading from one dwelling to the next through the cavity space at soffit level that abuts each dwelling.

D5: E-CB-compartment wall



DRAWING NOTES:

- 1 Full depth of timber wall panel or other demonstration that the cavity barrier or fire stopping function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.
- 2 For at a party floor junction detail see D8iii
- 3 Standard cavity barrier in full filled party/compartment walls or EI 60 cavity barrier in unfilled party/compartment walls

D5i: Plan view of compartment wall (option 1)

DETAIL NOTES:

Drylining omitted for clarity

Insulation omitted for clarity, except in compartment wall cavity

Wall ties, breather membrane and VCL omitted for clarity

Intumescent barrier option subject to manufacturer test compliance for cavity width present

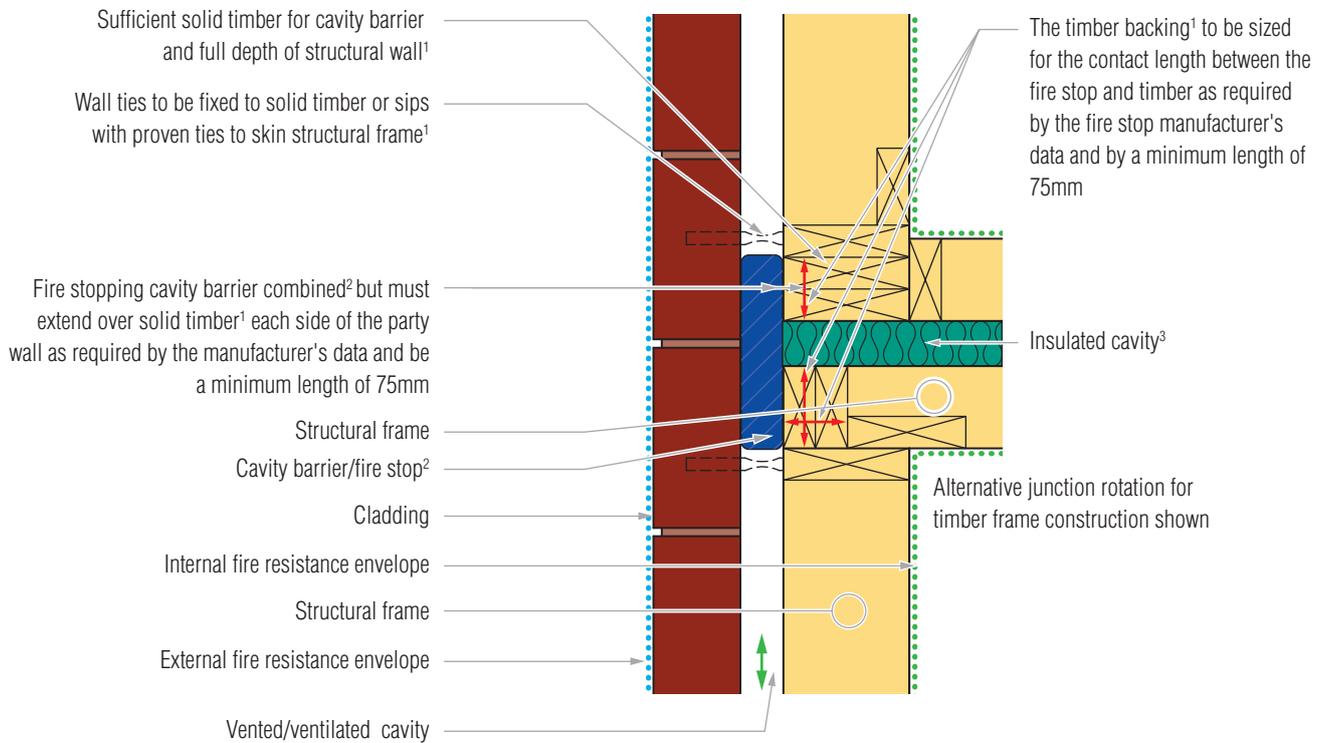
Ensure that the cavity barrier or fire stop is suitable for the gap provided, plus an allowance for presence or not of sheathing boards

Sheathing omitted for clarity (or may not be required)

DETAIL INTENTION:

To create barrier that stops the fire, in accordance with Statutory Guidance time requirements, spreading from one dwelling to the next through the compartment wall space into the external wall cavity and from the cavity space abutting the junction of the dwellings. The two cavity barriers in the external wall being an industry acceptable practice in guidance and providing the effective fire stop between dwellings when used in pairs. See D5ii alternative.

D5: E-CB-compartment wall cont.../



DRAWING NOTES:

- 1 Full depth of timber wall panel or other demonstration that the cavity barrier or fire stopping function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.
- 2 Cavity barrier in parallel to the external cavity line and for the party wall cavity space direction into the external cavity to be standard EI values for the given country (EI 30/15 England) but EI 60 where party/compartment walls are uninsulated.
- 3 Standard cavity barrier in full filled party/compartment walls or EI 60 cavity barrier in unfilled party/compartment walls

D5ii: Plan view of compartment wall (option 2)

DETAIL NOTES:

Drylining and insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

Intumescent barrier option subject to manufacturer test compliance for cavity width present

Wall ties/battens to cladding to be fixed back to solid timber elements of at least 38mm thick in direction resisting the fire (parallel to the facade), plus allow space for ties

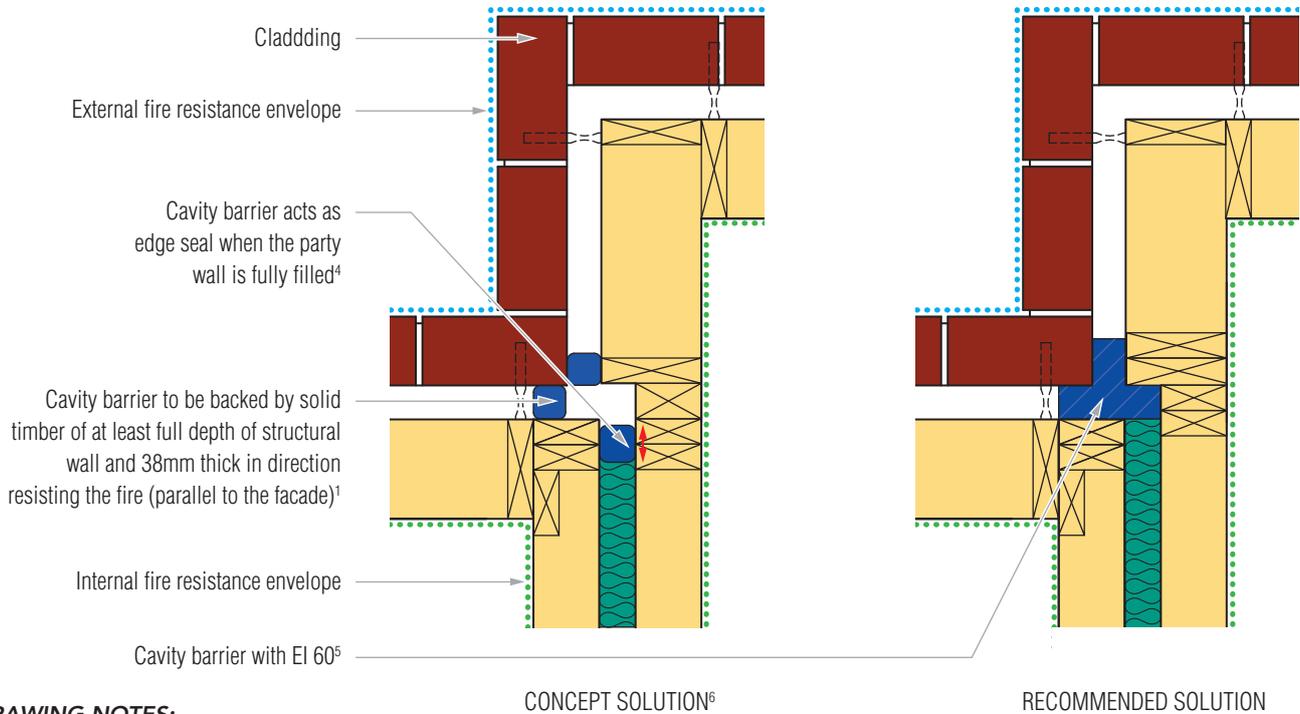
Ensure that the cavity barrier or fire stop is suitable for the gap provided, plus an allowance for presence or not of sheathing boards

Sheathing omitted for clarity (or may not be required)

DETAIL INTENTION:

To create barrier that stops the fire, in accordance with Statutory Guidance time requirements, spreading from one dwelling to the next through the compartment wall space into the external wall cavity and from the cavity space abutting the junction of the dwellings.

D5: E-CB-compartment wall cont.../



DRAWING NOTES:

- 1 Full depth of timber wall panel or other demonstration that the cavity barrier function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.
- 2 For at a party floor junction detail see D8iii
- 3 The timber backing to be sized for the contact length between the fire stop and timber as required by the fire stop manufacturer's data and by a minimum length of 75mm
- 4 Standard cavity barrier in full filled party walls or EI 60 cavity barrier in unfilled party walls.
- 5 Cavity barrier in parallel to the external cavity line and for the party wall cavity space direction into the external cavity to be standard EI values for the given country (EI 30/15 England) but EI 60 where party walls are uninsulated.
- 6 Requires high quality control and floor barrier at compartment floor zones.

D5iii: Plan view of staggered compartment wall (two options) ⁶ Requires high quality control and floor barrier at compartment floor zones

DETAIL NOTES:

Drylining omitted for clarity

Insulation omitted for clarity except for the party wall

Wall ties, breather membrane and VCL omitted for clarity

Intumescent barrier option subject to manufacturer test compliance for cavity width present

Ensure that the cavity barrier or fire stop is suitable for the gap provided, plus an allowance for presence or not of sheathing boards

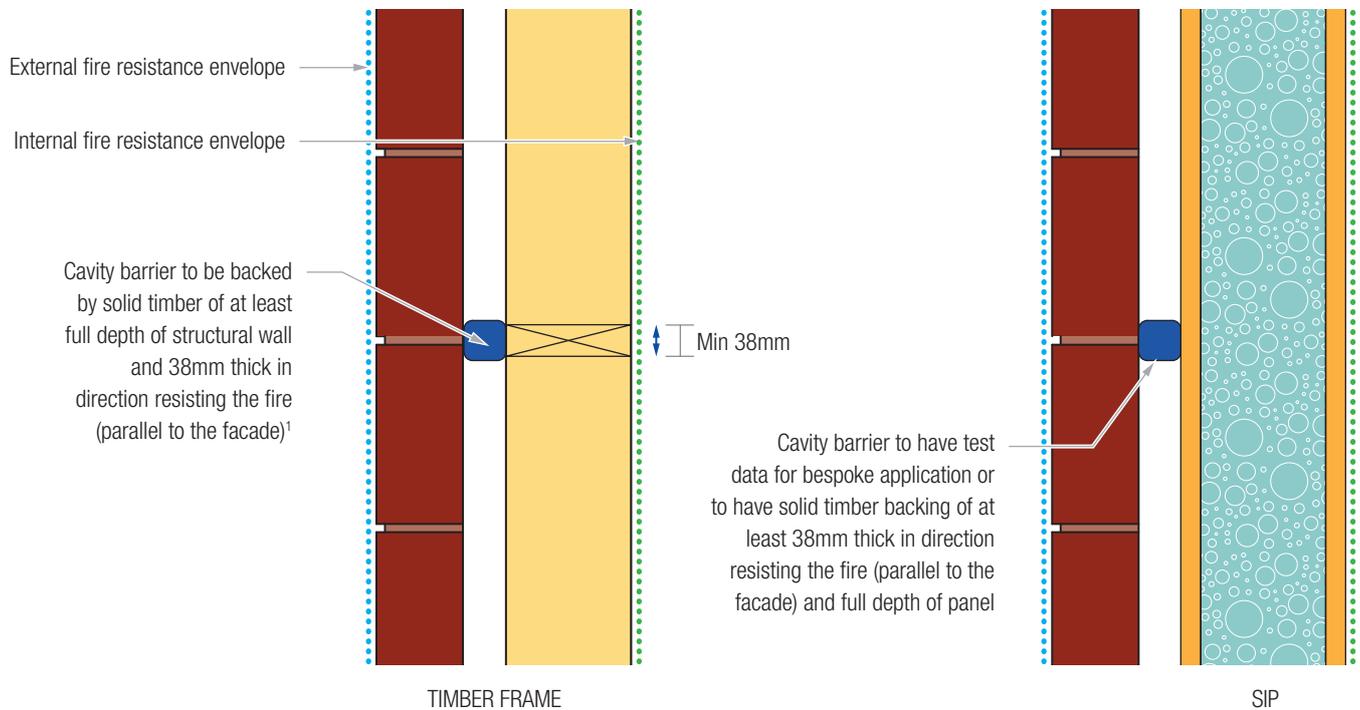
Sheathing omitted for clarity (or may not be required)

Gaps and voids formed from steps should be backed by solid timber or appropriate fire stopping. Consider cavity barrier filling the void to avoid loss of protection.

DETAIL INTENTION:

To create barrier that stops the fire, in accordance with Statutory Guidance time requirements, spreading from one dwelling to the next through the compartment wall space into the external wall cavity and from the cavity space abutting the junction of the dwellings. The two cavity barriers in the external wall being an industry acceptable practice in guidance and providing the effective fire stop between dwellings when used in pairs.

D6: E-CB-vertical



DRAWING NOTES:

- 1 Full depth of timber wall panel or other demonstration that the cavity barrier function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.

D6: Plan view of vertical cavity barrier (timber frame and SIP option)

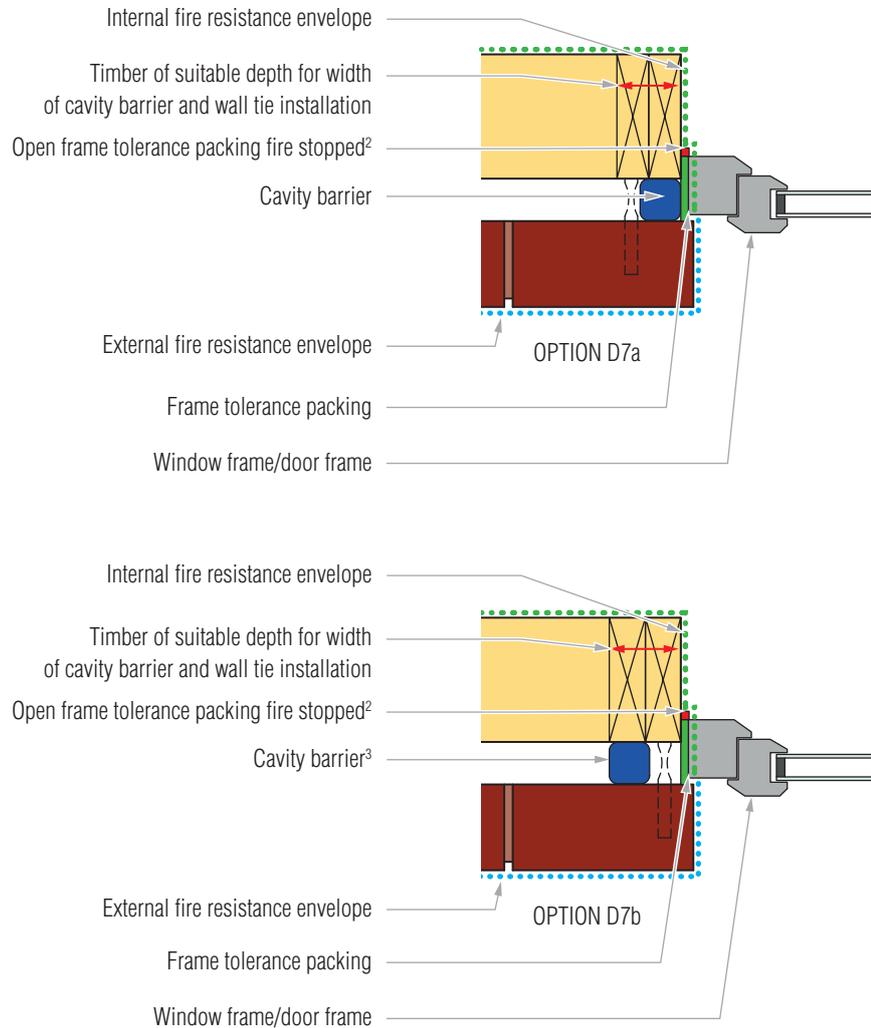
DETAIL NOTES:

- Drylining and insulation omitted for clarity
- Wall ties, breather membrane and VCL omitted for clarity
- Material types - intumescent options acceptable
- Sheathing omitted for clarity (or may not be required)

DETAIL INTENTION:

- To create cavity enclosures bound by cavity barriers when in the event of a fire in the cavity, it is inhibited from spreading between enclosures.

D7: E-CB-facade opening



DRAWING NOTES:

- 1 Full depth or other demonstration that the cavity barrier function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support
- 2 Fire stopping function may be from abutting drylining to timber frame to continue fire enclosure line
- 3 If there is a gap between the cavity barrier and end of the cavity (opening/window etc), this should be a space that has sufficient EI rating in the surrounding area that encloses the gap so as not to create a condition that will bypass the cavity barrier

D7i: Plan view of window reveal

DETAIL NOTES:

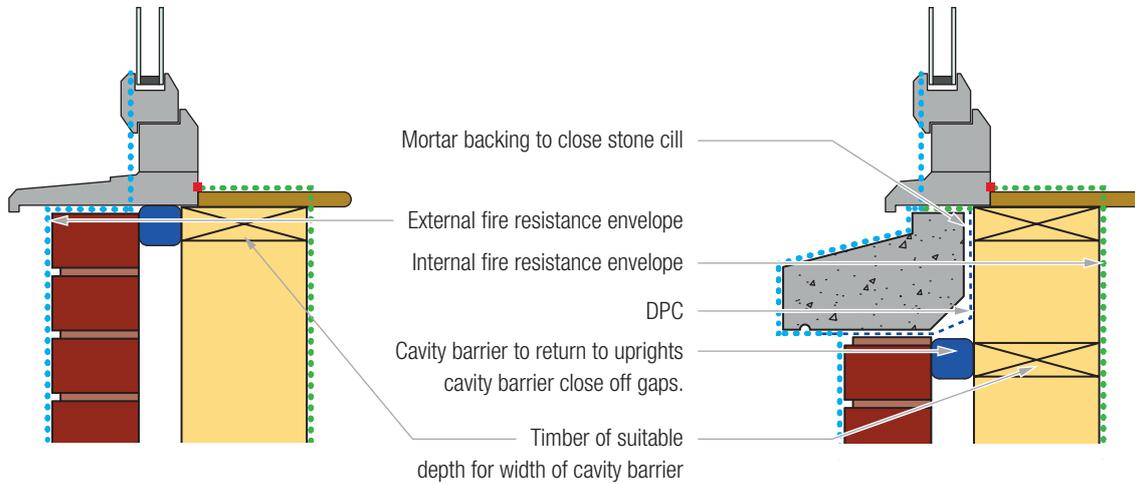
Interface junction of window frame and cladding typically requires movement allowable closer/filler but at boundary conditions this may require to be a fire stop

Cavity barrier to be backed by solid timber of at least full depth of structural wall and 38mm thick in direction resisting the fire (parallel to the facade)

DETAIL INTENTION:

To close off the ends of a cavity around an opening such that in the event of a fire it is inhibited from spreading into the cavity and to inhibit it entering the cavity.

D7: E-CB-facade opening cont.../



D7ii: Section of cill

DETAIL NOTES:

Interface junction of window frame and cladding typically requires movement allowable closer/filler but at boundary conditions this may require to be a fire stop

If there is a gap between the cavity barrier and end of the cavity (opening/window etc), this should be a space that has sufficient EI rating in the surrounding area that encloses the gap so as not to create a condition that will bypass the cavity barrier

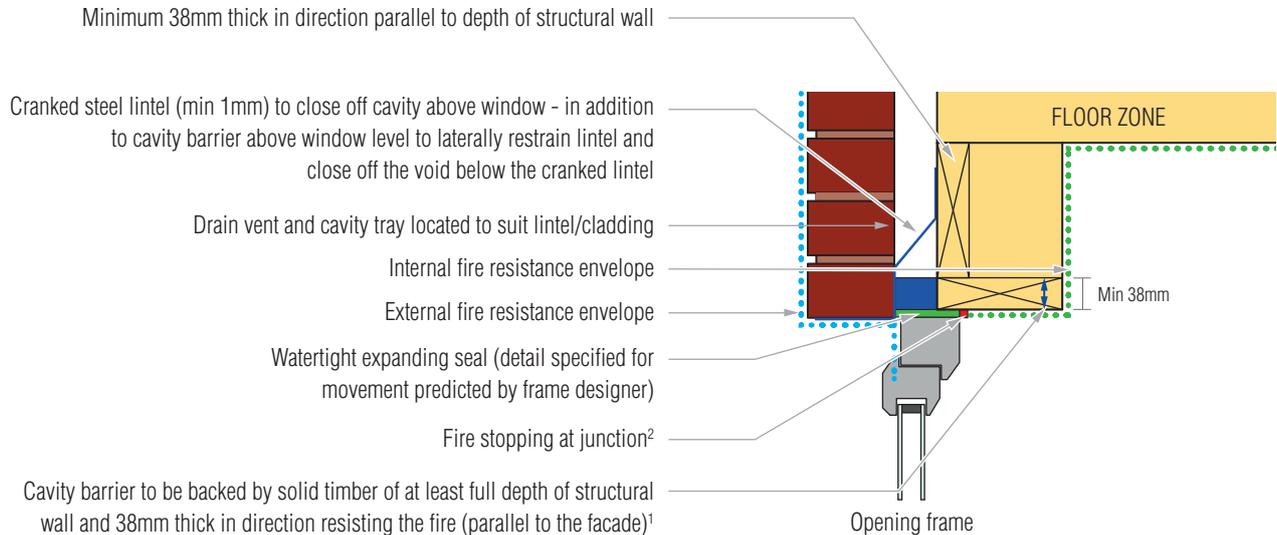
Where a specifically designed stone cill closes off the cavity, it can provide the function of the cavity barrier

Sheathing omitted for clarity (or may not be required)

DETAIL INTENTION:

To close off the ends of a cavity around an opening such that in the event of a fire it is inhibited from spreading into the cavity and to inhibit it entering the cavity.

D7: E-CB-facade opening cont.../



DRAWING NOTES:

- 1 Full depth of timber wall panel or other demonstration that the cavity barrier function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.
- 2 Fire stopping function may be from abutting drylining to timber frame

D7iii: Section at head of opening

DETAIL NOTES:

Interface junction of window frame and cladding typically requires movement allowable closer/filler but at boundary conditions this may require to be a fire stop

Interface junction of window frame and cladding typically movement allowable closer/filler but at boundary conditions this may require to be a fire stop

If there is a gap between the cavity barrier and end of the cavity (opening/window etc), this should be a space that has sufficient EI rating in the surrounding area that encloses the gap so as not to create a condition that will bypass the cavity barrier

Drylining and insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

Material types; intumescent options acceptable

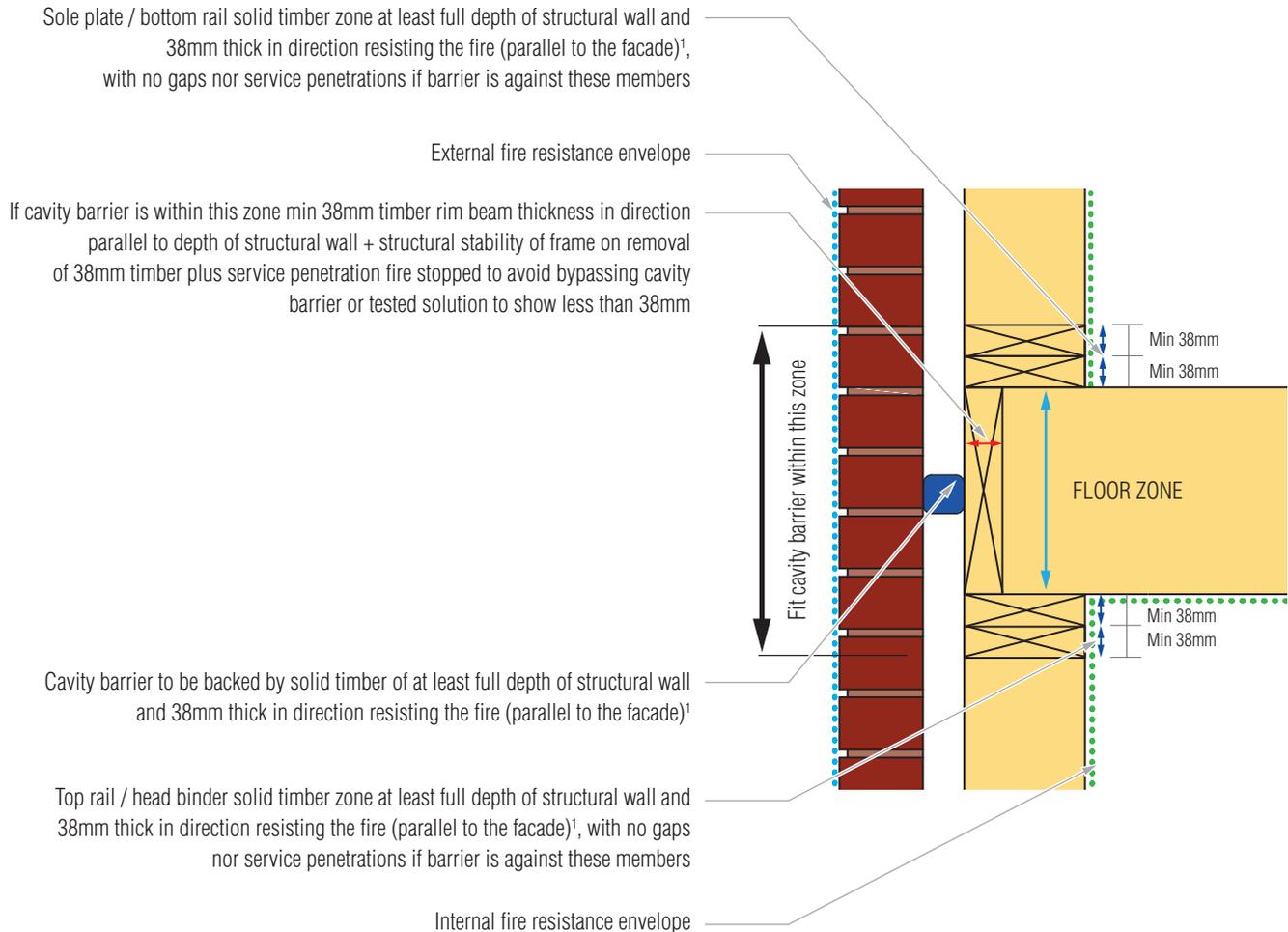
Sheathing omitted for clarity (or may not be required)

DETAIL INTENTION:

To close off the ends of a cavity around an opening such that in the event of a fire it is inhibited from spreading into the cavity and to inhibit it entering the cavity.

STA have a BS 8414 test with a similar lintel detail 'Structural Timber Association; BR135 classification for timber frame'. This can be found in the downloads section of the STA website www.structuraltimber.co.uk

D8: E-CB-floor



DRAWING NOTES:

- 1 Full depth of timber wall panel or other demonstration that the cavity barrier function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.

D8i: Section of full fill cavity barrier

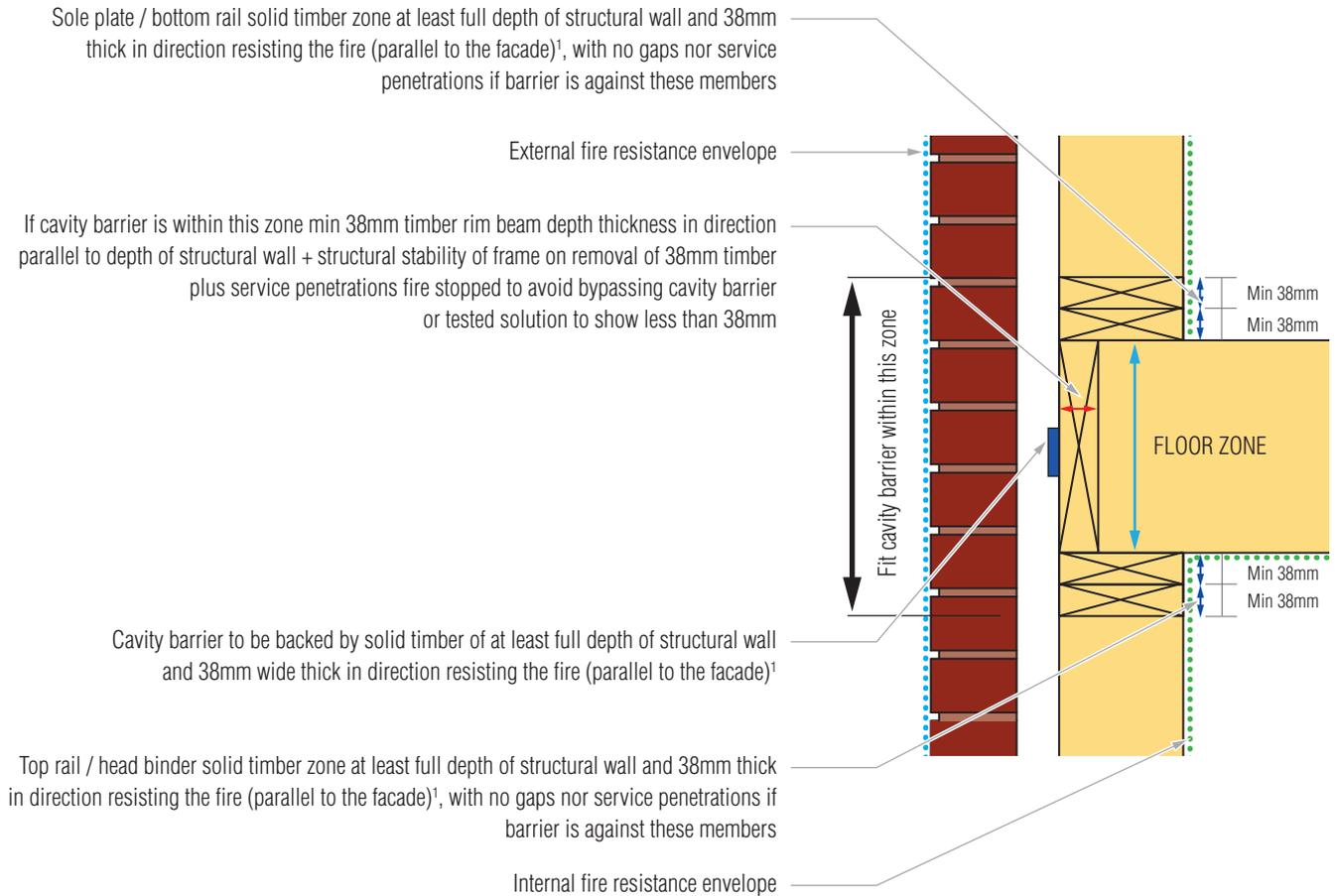
DETAIL NOTES:

- Single occupancy or compartment floor option
- Drylining and insulation omitted for clarity
- Wall ties, breather membrane and VCL omitted for clarity
- Sheathing omitted for clarity (or may not be required)
- Floating floors for compartment floor omitted for clarity
- Cavity barrier and vents not needed with intumescent barrier

DETAIL INTENTION:

To create cavity enclosures bound by cavity barriers when in the event of a fire in the cavity it is inhibited from spreading between enclosures.

D8: E-CB-floor cont.../



DRAWING NOTES:

- 1 Full depth of timber wall panel or other demonstration that the cavity barrier function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.

D8ii: Section of intumescent cavity barrier

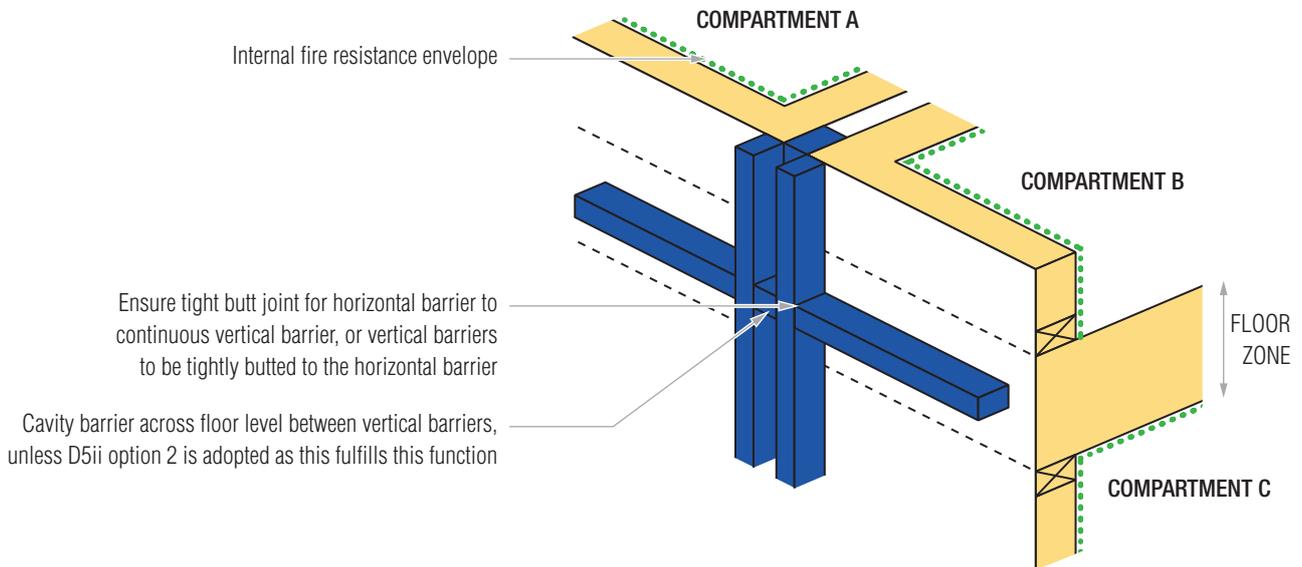
DETAIL NOTES:

- Single occupancy or compartment floor option
- Drylining and insulation omitted for clarity
- Wall ties, breather membrane and VCL omitted for clarity
- Sheathing omitted for clarity (or may not be required)
- Floating floors for compartment floor omitted for clarity
- Cavity barrier and vents not needed with intumescent barrier

DETAIL INTENTION:

To create cavity enclosures bound by cavity barriers when in the event of a fire in the cavity it is inhibited from spreading between enclosures.

D8: E-CB-floor cont.../



DRAWING NOTES:

- 1 For single dwellings, cavity enclosure sealed off with boxed eaves and no additional barriers above the standard details needed at the junction of floors
- 2 For multiple occupancy and compartment separation situations the building designer is to ensure that no joints or access into the void is present. Where masonry movement joints are provided in the line of the party wall cavity then the joint shall comprise fire resistant/intumescent filler, or a horizontal barrier across the floor level, or other demonstration that the fire spread in the cavity will be restricted and inhibited from spreading to the compartments and outside of the cavity created. If required for a specific design case it is recommended that intumescent cavity barrier is used to avoid unintentional consequences of cavity trays and weep holes and interference with the vertical cavity barrier.

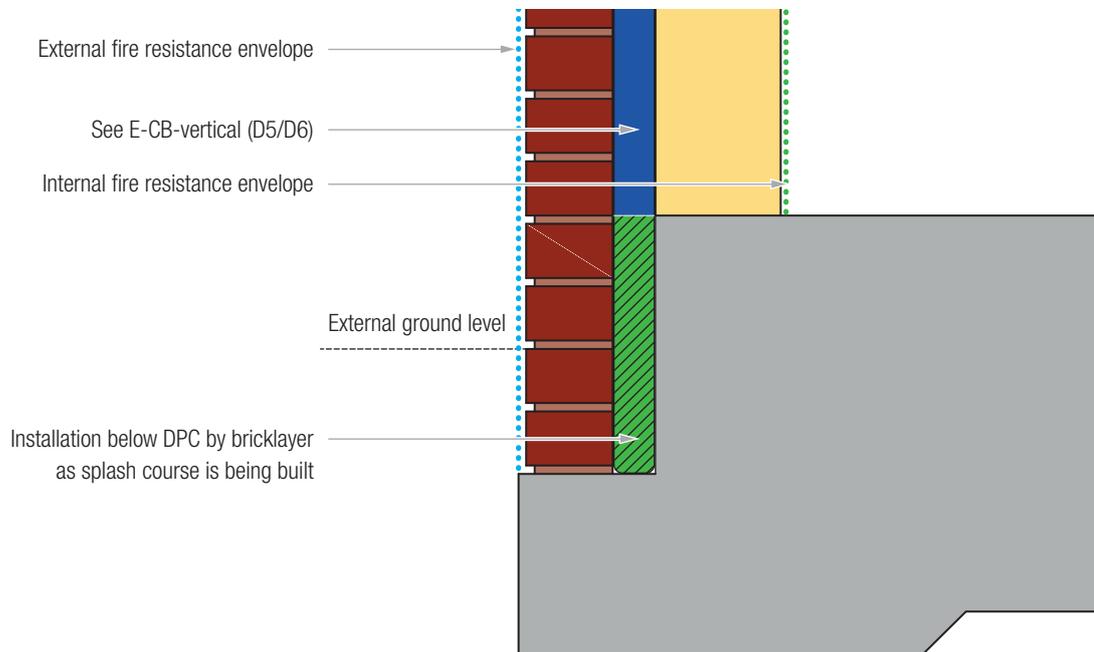
D8iii: Cavity barrier at party floor/party wall junction

DETAIL NOTES:

To create cavity enclosures bound by cavity barriers when in the event of a fire in the cavity it is inhibited from spreading between enclosures.

Sheathing omitted for clarity (or may not be required)

D9: E-CB-below DPC



D9: Section below DPC

DETAIL NOTES:

DPC omitted for clarity

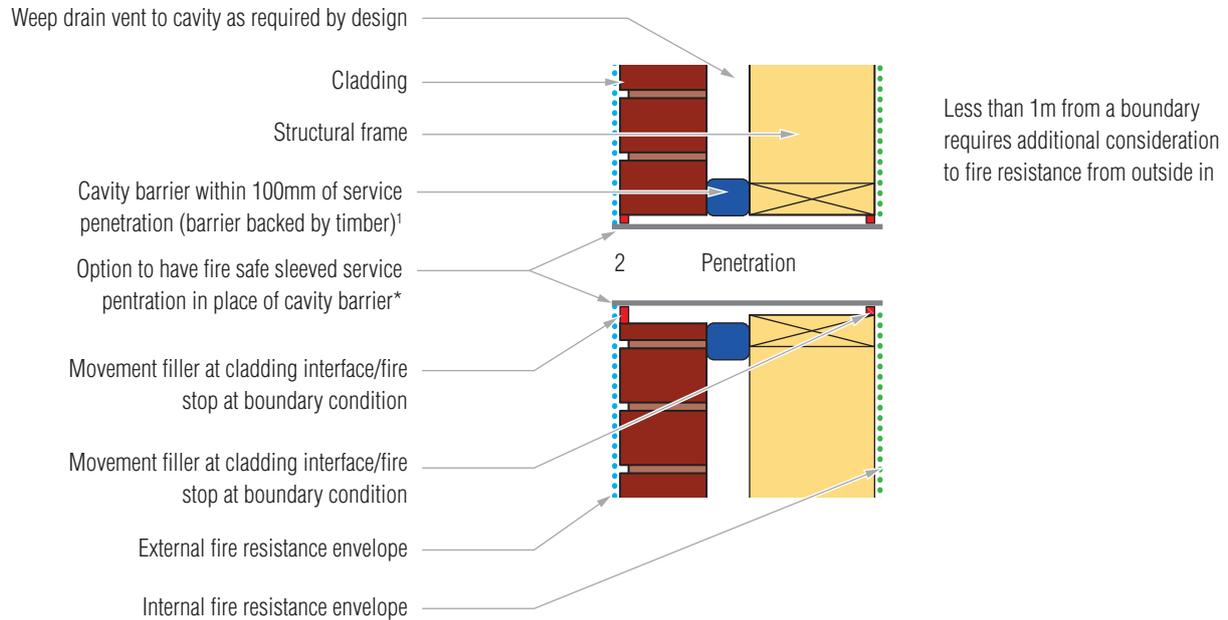
Cavity barrier below DPC can be mineral wool or masonry with appropriate DPC detailing

Sheathing omitted for clarity (or may not be required)

DETAIL INTENTION:

To create cavity enclosures bound by cavity barriers when in the event of a fire in the cavity it is inhibited from spreading between enclosures.

D10: E-CB-larger services



DRAWING NOTES:

- 1 Full depth of timber wall panel or other demonstration that the cavity barrier function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.
- 2 Designer to consult fire safety strategy for fire resistant cap to the service penetration

D10i: Section around service penetration

DETAIL NOTES:

Drylining and insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

Intumescent barrier option subject to manufacturer test compliance for cavity width present

* Building regulation statutory guidance allows 0.5mm steel sleeved penetration. Cavity barrier recommended when steel sleeved penetrations adopted to stop the spread of heat beyond the steel sleeve

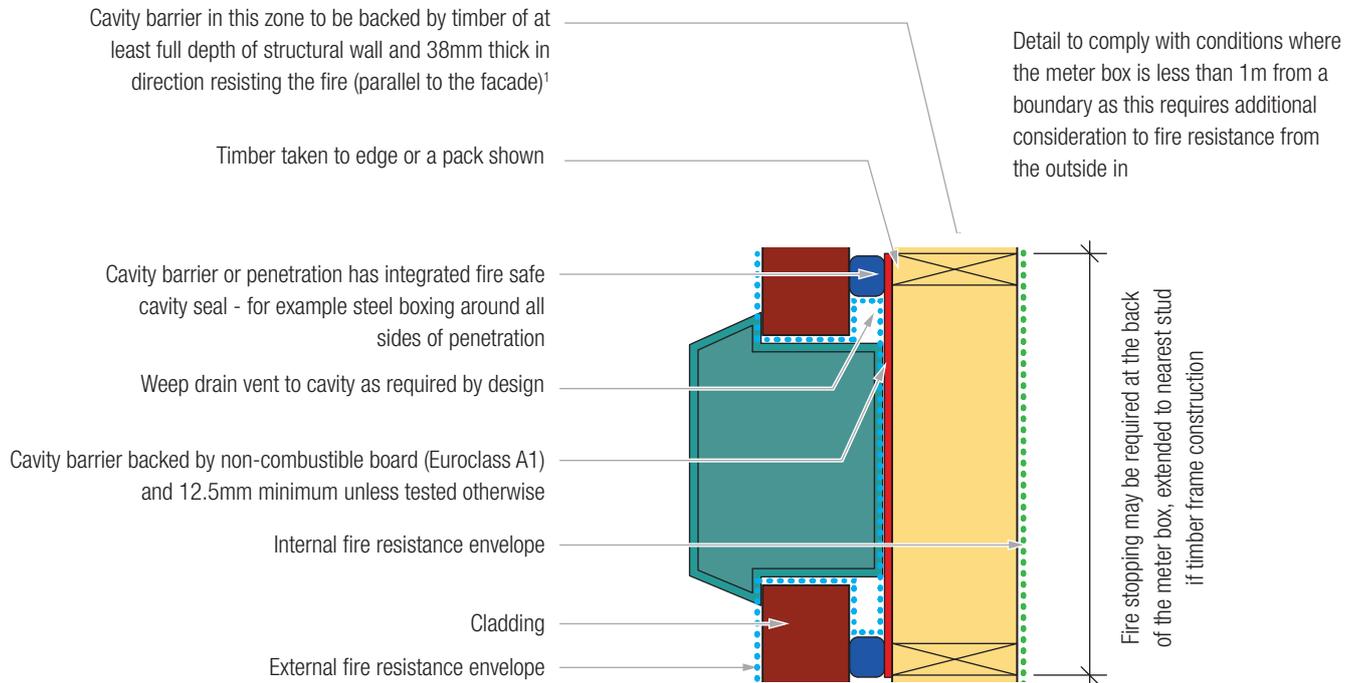
Openings for services through a fire separating element to be sealed with fire stopping to ensure that the fire resistance of the element is not impaired. Fire stopping delays the spread of fire and generally also the spread of smoke

Sheathing omitted for clarity (or may not be required)

DETAIL INTENTION:

To close off the edge of a cavity caused by the service penetration. In addition to ensure that the envelope of the fire resistance assembly is maintained by fire stopping junctions at the surface of the service penetration.

D10: E-CB-larger services cont.../



DRAWING NOTES:

- 1 Full depth of timber wall panel or other demonstration that the cavity barrier function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.

D10ii: Plan view of meter box

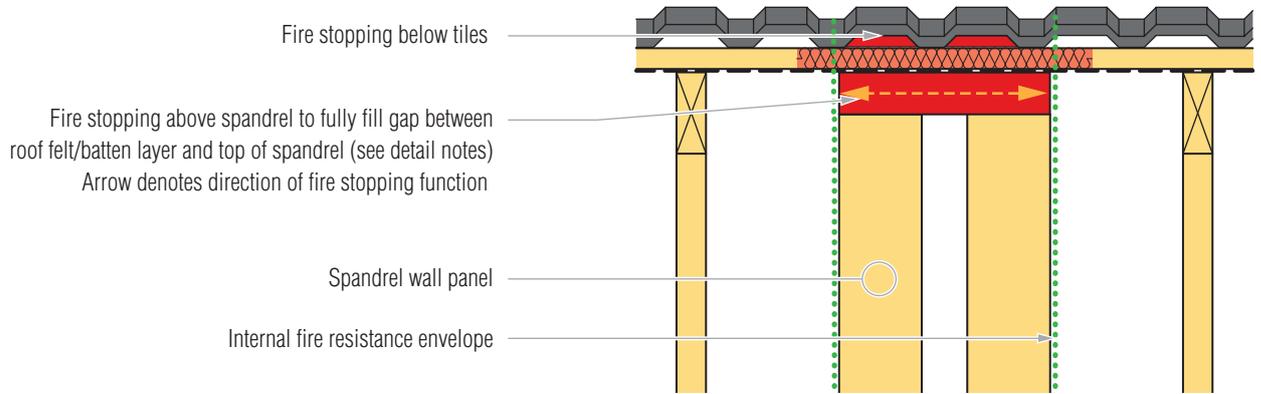
DETAIL NOTES:

Movement filler at cladding interface/fire stop at boundary condition
Sheathing omitted for clarity (or may not be required)

DETAIL INTENTION:

To close off the edge of a cavity caused by the service penetration. In addition to ensure that the envelope of the fire resistance assembly is maintained by fire stopping junctions at the surface of the service penetration.

D11: PW-FS-1-spandrel fire stop (tiled roof junction)



DRAWING NOTES:

- 1 Full depth of timber wall panel or other demonstration that the cavity barrier function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.
- 2 Fire stopping needed when single leaf spandrels adopted

D11: Section of spandrel fire stop at tiled roof junction of compartment wall

DETAIL NOTES:

Cold and warm roof structures

Drylining and insulation omitted for clarity

Fire stopping width or depth across the spandrel wall panel as required by the manufacturer to provide EI 60. It is good practice to have it protruding outside the line of spandrel wall drylining so it can be seen to be present but not essential, other than consideration to the junction of the drylining of the spandrel.

Option for fully insulated cavity wall removes the need for fire stop at ceiling level. The cavity space may require a cavity barrier as an end seal for thermal regulations and it is good practice to close off the cavity even when fully filled.

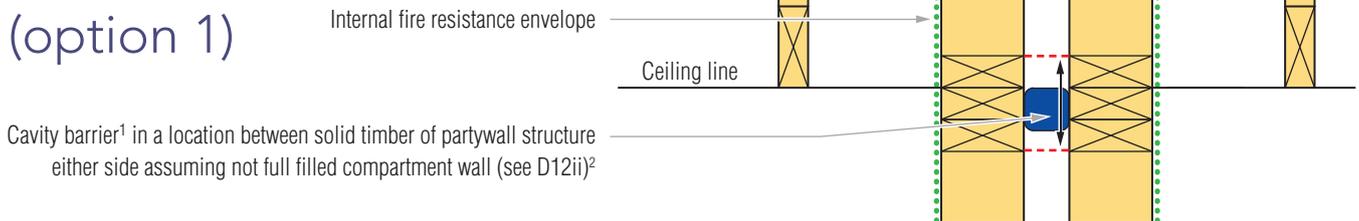
The top of a spandrel must be fire stopped

Sheathing omitted for clarity (or may not be required)

DETAIL INTENTION:

To create barrier that stops the fire, in accordance with Statutory Guidance time requirements, spreading from one dwelling to the next through the compartment wall junction between dwellings.

D12: I-CB-1-ceiling zone compartment wall (option 1)

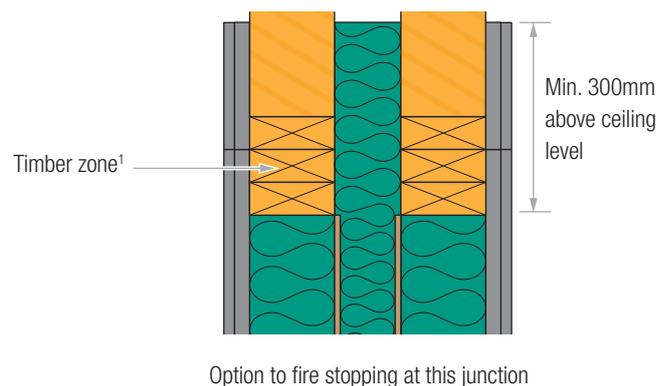


DRAWING NOTES:

- 1 Full depth of timber wall panel or other demonstration that the cavity barrier function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.
- 2 Fire stopping needed when single leaf spandrels adopted.

D12i: Section of ceiling zone compartment wall (option 1)

D12: I-CB-1-ceiling zone compartment wall (option 2)



DRAWING NOTES:

- 1 Full width of timber wall panel or other demonstration that the cavity barrier function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.

D12ii: Section of ceiling zone compartment wall (option 2)

DETAIL NOTES:

Cold and warm roof structures

Drylining and insulation omitted for clarity

Fire stopping width or depth across the spandrel wall panel as required by the manufacturer to provide EI 60. It is good practice to have it protruding outside the line of spandrel wall drylining so it can be seen to be present but not essential, other than consideration to the junction of the drylining of the spandrel.

Option for fully insulated cavity wall removes the need for fire stop at ceiling level. The cavity space may require a cavity barrier as an end seal for thermal regulations and it is good practice to close off the cavity even when fully filled. The top of a spandrel must be fire stopped

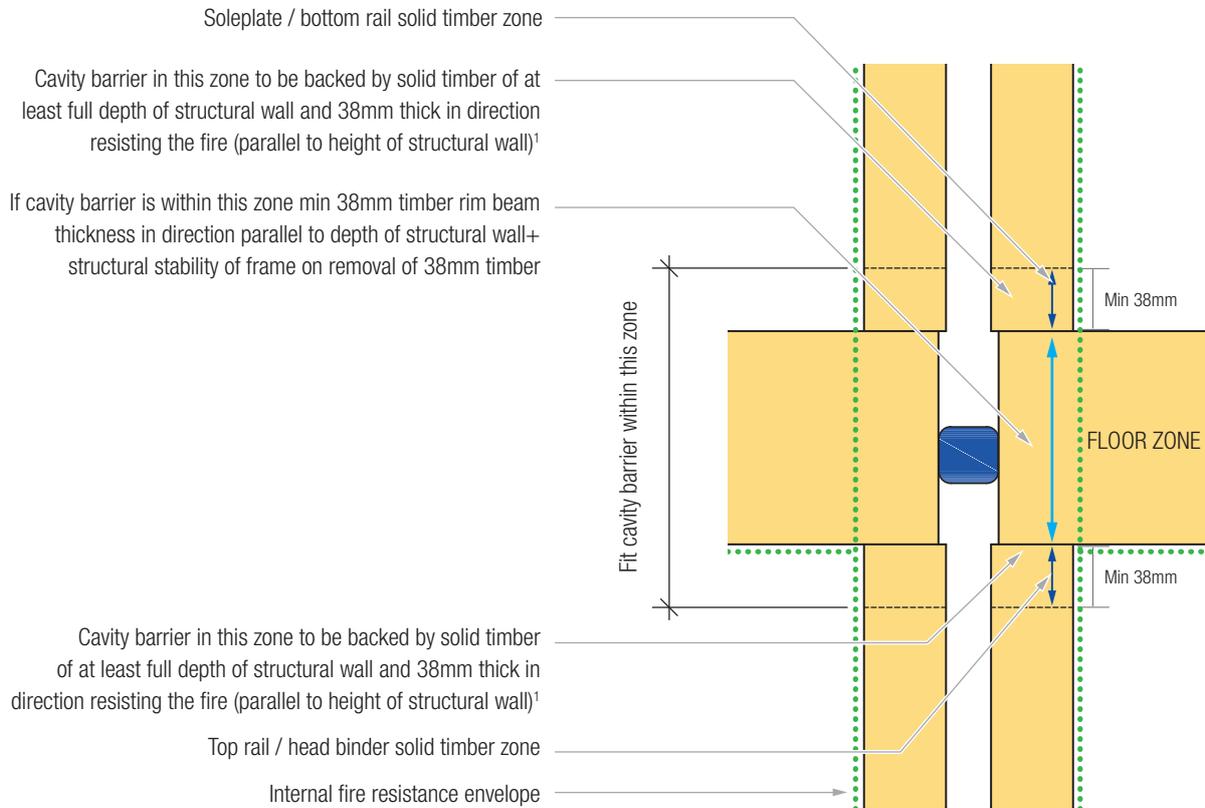
Sheathing omitted for clarity (or may not be required)

DETAIL INTENTION:

Option 1: To close off a compartment wall cavity when fully filled mineral wool or party wall glass wool insulation is not present

Option 2: To close off a compartment wall cavity.

D13: I-CB-floor zone



DRAWING NOTES:

- 1 Full depth of the element or other demonstration that the cavity barrier function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.

D13i: Section of floor zone cavity barrier

DETAIL NOTES:

Drylining and insulation omitted for clarity

Ties and VCL omitted for clarity

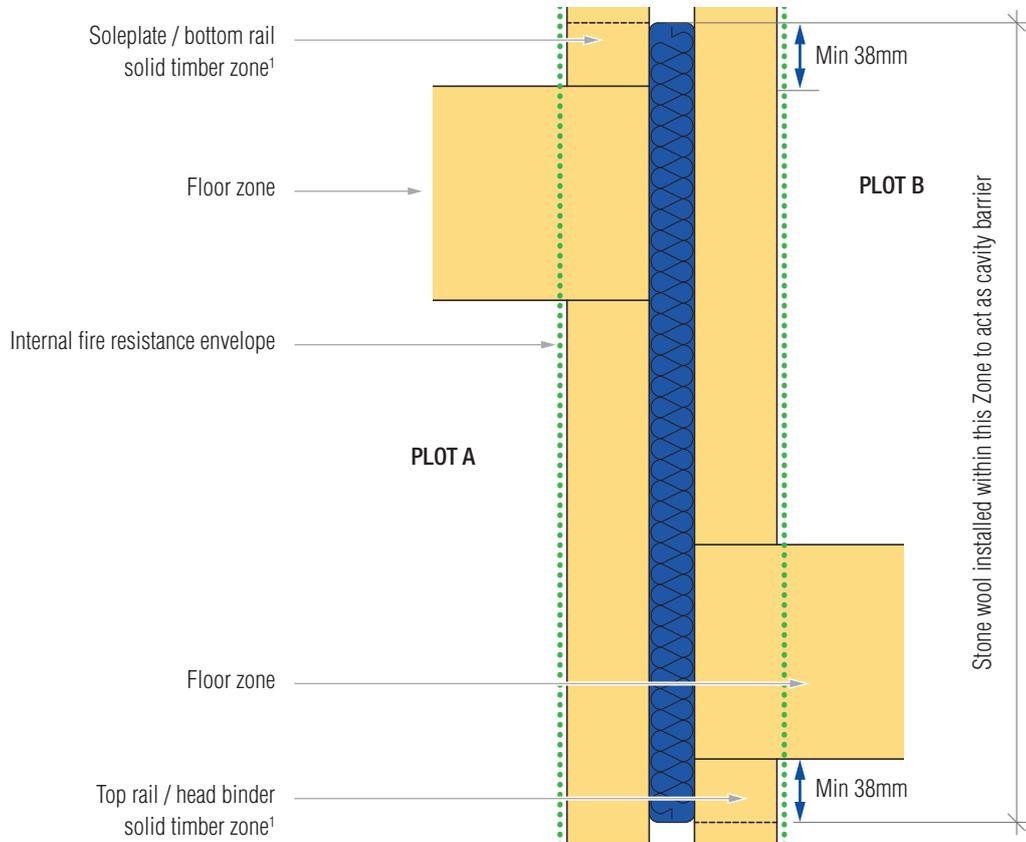
Intumescent barrier option subject to manufacturer test compliance for cavity width present

Sheathing omitted for clarity (or may not be required)

DETAIL INTENTION:

To create cavity enclosures bound by cavity barriers when in the event of a fire in the cavity it is inhibited from spreading between enclosures.

D13: I-CB-floor zone cont.../



DRAWING NOTES:

- 1 Full depth of the element or other demonstration that the cavity barrier function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.

D13ii: Section of stepped floor zone cavity barrier

DETAIL NOTES:

Drylining and insulation omitted for clarity

Ties and VCL omitted for clarity

Intumescent barrier option subject to manufacturer test compliance for cavity width present

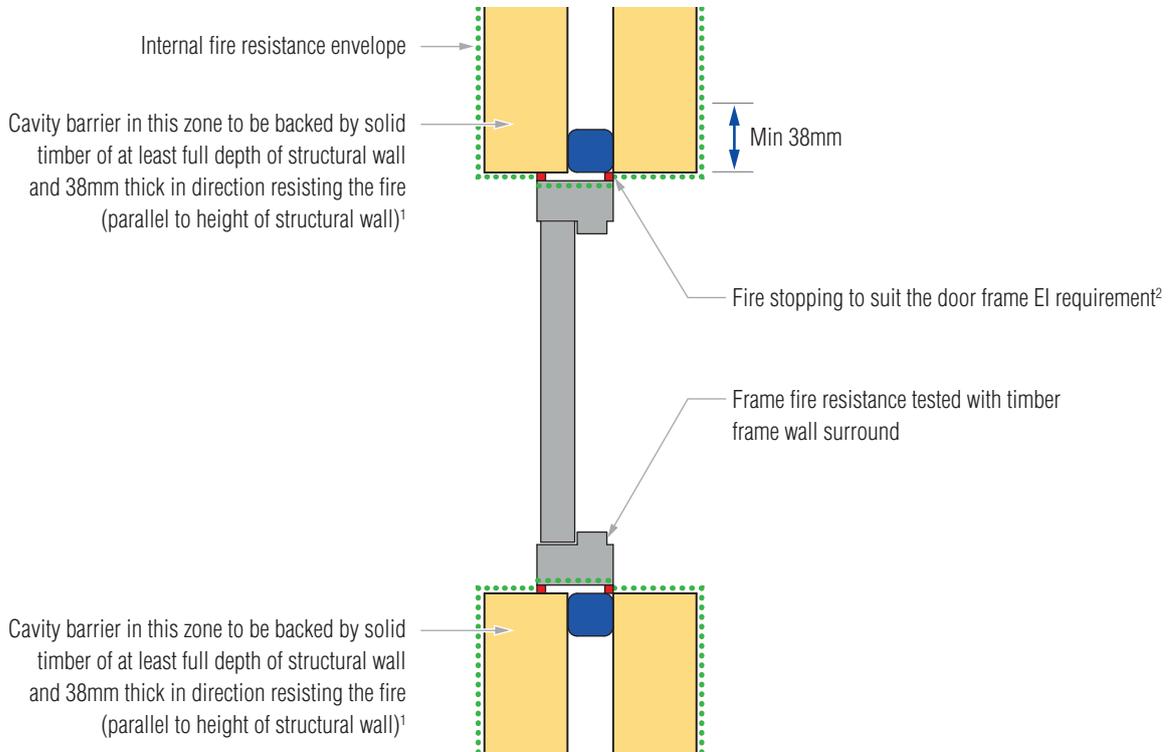
Sheathing omitted for clarity (or may not be required)

DETAIL INTENTION:

To create cavity enclosures bound by cavity barriers when in the event of a fire in the cavity it is inhibited from spreading between enclosures.

The designer of this step is to demonstrate that fire resistance of the party wall is maintained between compartments.

D14: I-CB-opening



DRAWING NOTES:

- 1 Full depth of the element or other demonstration that the cavity barrier function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.
- 2 Fire stopping function may be from abutting drylining to timber frame.

D14: Plan view of internal party/compartment wall opening

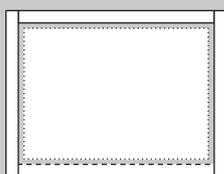
DETAIL NOTES:

Sheathing omitted for clarity (or may not be required)

Drylining omitted for clarity cavity barrier may be omitted where full fill mineral or party wall glass wool insulation is present - fully packed to edge

Full filled cavity can provide cavity barrier - provided it extends to the ends. Additional cavity barriers is good practice to ensure ends are sealed.

Intumescent barrier option subject to manufacture test compliance for cavity width present



Cavity barrier to be continuous around the whole perimeter of the opening with all gaps closed

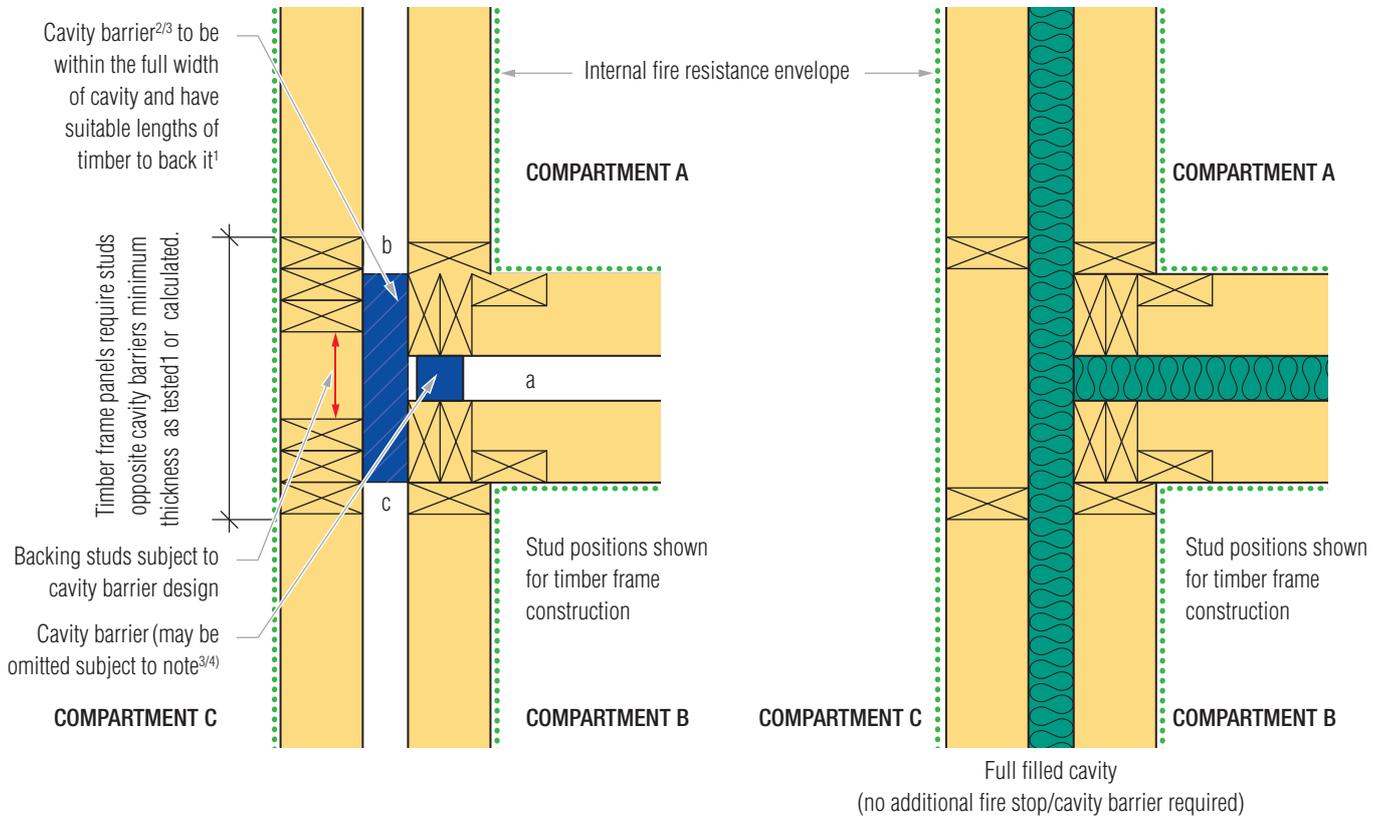


Corner option

DETAIL INTENTION:

To close off the ends of a cavity around an opening such that in the event of a fire it is inhibited from spreading into the cavity and to inhibit it entering the cavity.

D15: I-CB-internal compartment wall T-junction



DRAWING NOTES:

- 1 Full depth of the element or other demonstration that the fire stop function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.
- 2 Cavity barrier shall be suitable product for this application (test certificate) to provide EI 60 in all directions at this junction.
- 3 Optional inclusion of cavity barrier to complement EI in direction to Compartment C, subject to test/calculation justification of junction. The EI requirement is to be in all directions parallel to the cavity.
- 4 Cavity barrier in both directions of the cavity is to provide appropriate fire resistance with a to b, a to c, b to c, a to d, to have EI 60 in total.

D15: Plan view of internal compartment wall T-junction (two options)

DETAIL NOTES:

Drylining and insulation omitted for clarity

Intumescent barrier option subject to manufacturer test compliance for cavity width present

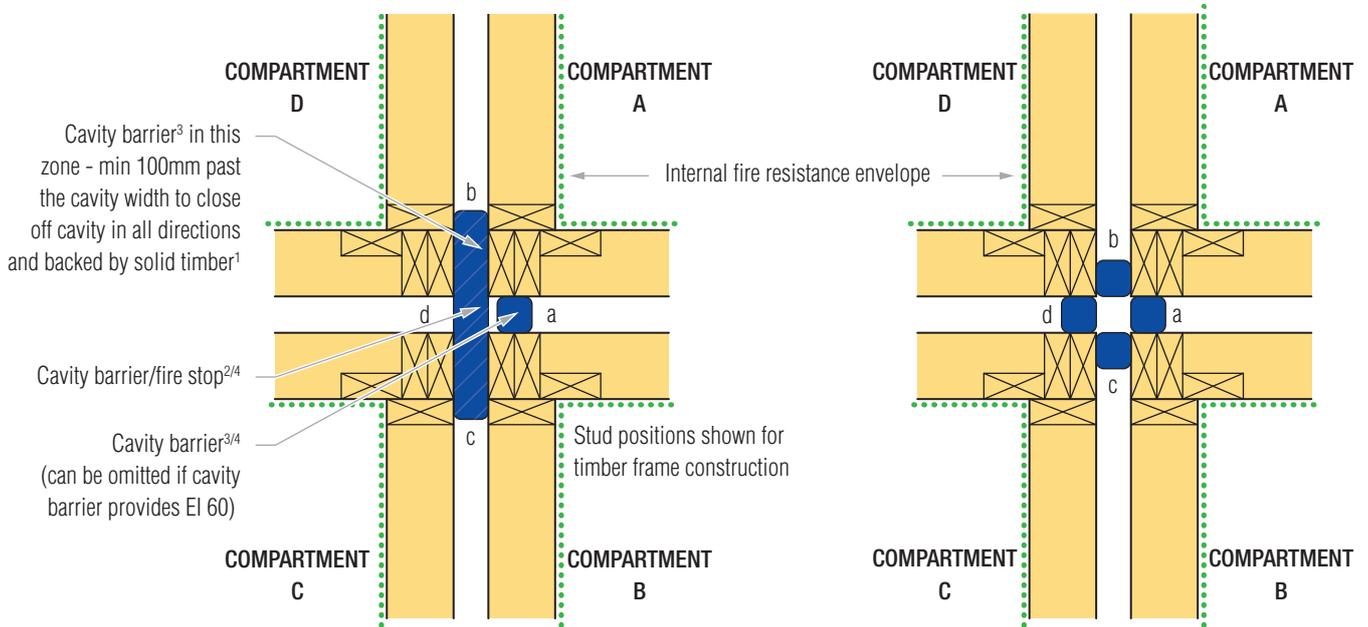
Cavity barrier may already be incorporated by full fill mineral wool or party wall glass wool insulation

Sheathing omitted for clarity (or may not be required)

DETAIL INTENTION:

To create barrier that stops the fire, in accordance with Statutory Guidance time requirements, spreading from one compartment to the next through the cavity formed by uninsulated spaces. Fire stop to provide EI 60 at this junction.

D16: I-CB-internal compartment wall X-junction



DRAWING NOTES:

- 1 Full depth of element or other demonstration that the cavity barrier function is not bypassed by fire passing within the attached structural wall element. The specific design of the cavity barrier may require a thicker timber support.
- 2 Cavity barrier is acting as a fire stop and shall be suitable product for this application (test certificate) to provide EI 60 in all directions at this junction.
- 3 Optional inclusion of cavity barrier to complement EI in direction to Compartment A to D or B to C, subject to test/calculation justification of junction.
- 4 Cavity barrier in both directions of the cavity is to provide appropriate fire resistance with a to b, a to c, b to c, a to d, to have EI 60 in total

D16: Plan view of internal compartment wall X-junction (two options)

DETAIL NOTES:
 Drylining and insulation omitted for clarity
 Intumescent barrier option subject to manufacturer test compliance for cavity width present and EI rating
 Fire stop may already be incorporated by full fill mineral wool or party wall glass wool insulation
 Sheathing omitted for clarity (or may not be required)

DETAIL INTENTION:
 Spreading from one compartment to the next through an uninsulated the compartment cavity space abutting the junction of the dwellings.

6. Cavity barrier installation care points

Essential contract understanding



6.1 Care points for contract agreement

The STA member shall, in writing, agree the one of the following.

CONTRACT TYPE	AGREE
CBFS-A Where design, supply and installation of cavity barriers or fire stopping is not provided by the Structural Timber Building System supplier. The services are provided by others.	<input type="checkbox"/>

CBFS-B Specific services are to be agreed to be provided by the Structural Timber Building System supplier	<input type="checkbox"/>
--	--------------------------

SPECIFIC SERVICE BY THE SPECIALIST INSTALLER	DESIGN	SUPPLY	INSTALL
Location 1 (define)	Yes / No	Yes / No	Yes / No
Location 2	Yes / No	Yes / No	Yes / No
ETC	Yes / No	Yes / No	Yes / No

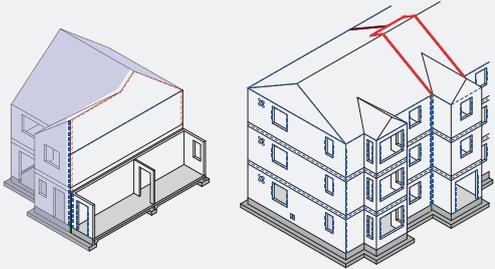
CBFS-C Specialist installer responsible for the façade or fire envelope finishes undertakes the following	<input type="checkbox"/>
---	--------------------------

SPECIFIC SERVICE BY THE SPECIALIST INSTALLER	DESIGN	SUPPLY	INSTALL
Location 1 (define)	Yes / No	Yes / No	Yes / No
Location 2	Yes / No	Yes / No	Yes / No
ETC	Yes / No	Yes / No	Yes / No



6.2 Care points for designers

Relevant to any business undertaking this role within a project.

PROCESS	CARE POINTS	PHOTO / DIAGRAM / REFERENCE
1	Determine location of fire stopping and cavity barriers Understand the difference	 <p>For locations to close and divide a cavity see Part 3 of guidance</p>
2	Provide details for each location Tolerance of the frame cladding is to be considered	<p>Provide details taking account of tolerances and project details. See Part 4 of guidance for additional information</p>
3	Provide specification cavity barrier types and fire stopping types	<p>Select cavity barriers with appropriate compliance certification; test certificates from UKAS test authority Refer to manufacturer's literature for tests to BS or EN standards and compliance for the actual application being designed Check where appropriate, if construction element fulfilling another use will also provide the cavity barrier Do not mix and match products (manufacturer/type) in any one vertical/horizontal section without manufacturer's approval</p>
4	Undertake the designer's checklist - see following page	<p>Recommendation to incorporate as part of the company STA quality procedures for future checks</p>
5	Tender details to include a sign off strategy for auditing the correct installation of cavity barriers and fire stopping	<p>Recommendation to engage with an STA member company under STA Assure training and installation audit process for relevant cavity barriers and fire stopping installation</p>

NOTE:

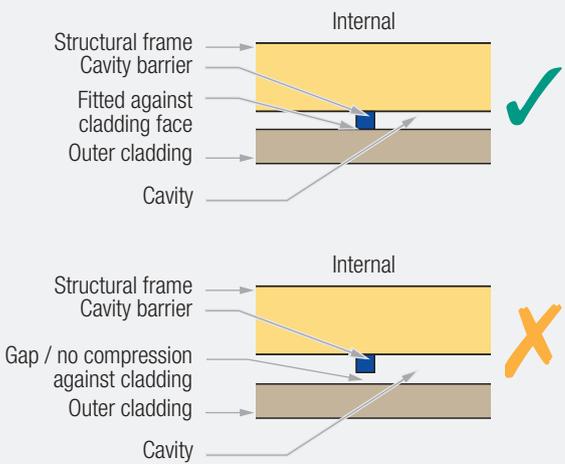
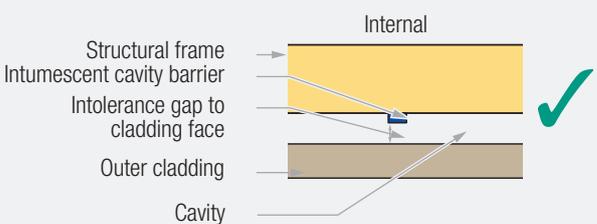
Fire safety information to be considered by the designer. For any building work there are legal requirements to provide summary fire compliance documents for to hand over to the Principal Designer who in turn passes it to the building "responsible person". Guidance required to be submitted of the fire-separating elements (which may be the cavity barriers) is the responsibility of the company who has agreed to take the design and install responsibility in the contract.

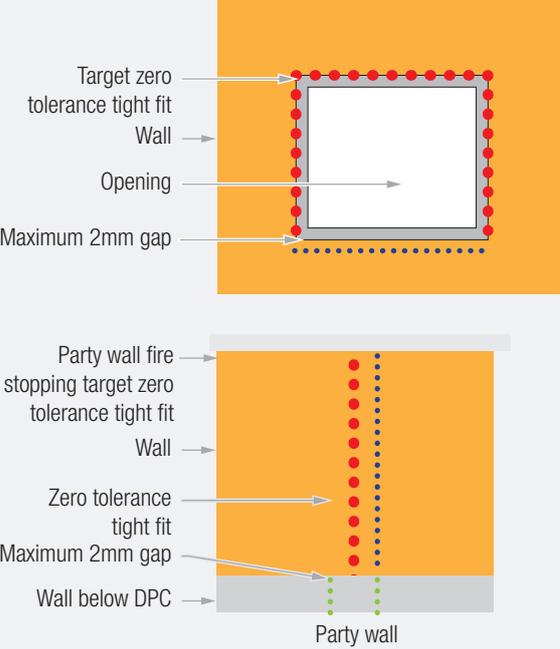
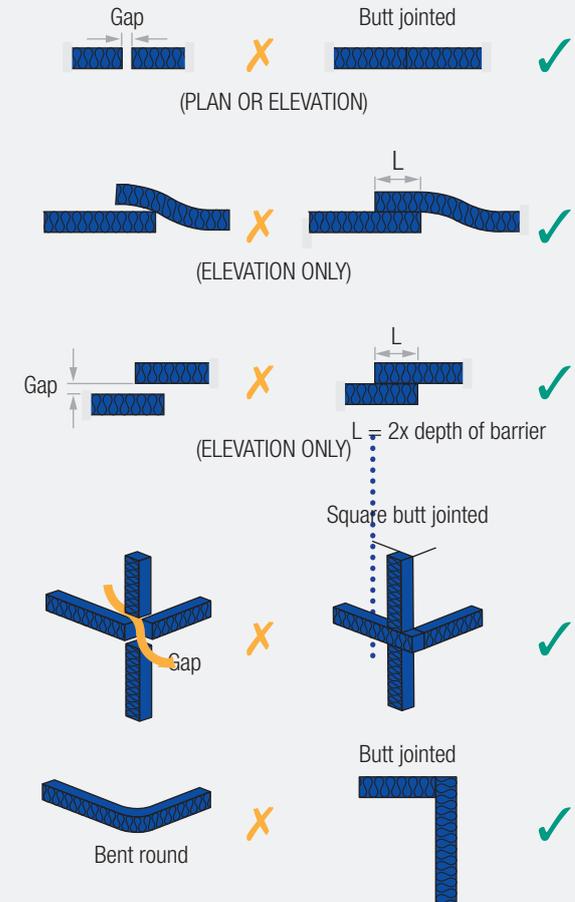
6.3 Checklist for designers

Relevant to any business undertaking this role within a project - to be agreed in the contract who is responsible for the design of cavity barriers and scope and interface with other trades and design areas of responsibility.

SCOPE OF DESIGN		CHECK
Agreement as to the scope of cavity barrier design and if it is to be more than statutory guidance e.g. to STA recommendations		<input type="checkbox"/>
LOCATION CHECK FOR EACH ITEM(S)		
Around openings in the cladding	<input type="checkbox"/>	At centres on plan no more than 10m /20m (country and project specific)
At floor levels	<input type="checkbox"/>	
At party walls	<input type="checkbox"/>	At roof eaves/upper ceiling level
At different junctions of building:	1) Steps and staggers <input type="checkbox"/> 2) Garage/house junction <input type="checkbox"/> 3) Internal compartment walls <input type="checkbox"/>	4) Cladding interfaces/different types <input type="checkbox"/> 5) Projections/bays <input type="checkbox"/>
At service penetrations (fire stopping will be required in most locations)		<input type="checkbox"/>
At service cupboards		<input type="checkbox"/>
Tender/pre-construction information STA Assure installer for barriers		<input type="checkbox"/>
CHECK TARGET TOLERANCES FOR THE CAVITY WIDTH		
Cavity barriers to be specified for the cavity tolerance on the project. See Part 1 of guidance Note that cavity barriers should be suitable for irregular spaces due to build tolerances		<input type="checkbox"/>
Provide guidance on what to do if target tolerances of the cavity width are not achieved in the building process		<input type="checkbox"/>
Note fire stopping needed at gaps / imperfection of fit for the line of fire resistance required		<input type="checkbox"/>
Fire stopping materials are to be suitable for irregular spaces and suitable / test certificate for the application		<input type="checkbox"/>
Reference guidance on fire stopping. Association for Specialist Fire Protection (ASFP) website (www.asfp.org)		<input type="checkbox"/>
The specification of products used shall be fixed so that their performance is unlikely to be made ineffective by:		<input type="checkbox"/>
<ul style="list-style-type: none"> Movement of the building due to subsidence, shrinkage or temperature change and movement of the external envelope due to wind Collapse in a fire of services that may be bridging a cavity; for which they shall have a cavity barrier to cover them Failure in a fire of fixings or elements to which the cavity barrier may be fixed 		<input type="checkbox"/>
ALTERNATIVE DESIGN APPROACH		
BS 9999 (commercial) BS9991 (residential) is the fire safety code of practice for building design, management and use. The standard outlines ways to meet fire safety legislation through a more flexible approach to design. Has this been considered / applied		<input type="checkbox"/>
Cross reference to project fire safety strategy for specific bespoke design - see STA Advice Note 7.3 on fire safety strategy		<input type="checkbox"/>

6.4 Care points for installers/checkers

PROCESS	CARE POINTS	PHOTO / DIAGRAM / REFERENCE
1	<p>Know why installing cavity barrier correctly is important:</p> <ul style="list-style-type: none"> • Cavities can act as chimneys which can draw fire to spread beyond the original location • An effectively installed cavity barrier provides resistance to fire spread and slows the spread of fire • If cavity barriers are not installed correctly or removed and damaged, they will no longer be able to provide the resistance to fire spread which could endanger lives <p>STA recommend using a trained installer who is provided with installer verification on the timber frame card upon completion¹</p> <p>Do not mix cavity barrier types and makes in any one vertical or horizontal line without approval from the designer</p> <p>Check maximum cavity width for barrier. If different, STOP WORK and seek advice</p>	 <p>STA - cavity barrier installer card (will differ depending on contract agreement)</p>
2	<p>Key points for solid timber or mineral wool cavity barriers:</p> <ul style="list-style-type: none"> • If the alignment tolerance of the frame is known to be outside specification tolerance, then this shall be brought to the attention of the works manager for specification change request • Ensure cavity barriers are located at the edges of cavities including openings and service penetrations when installed before the cladding is completed • Ensure that cavity barriers are matched to the cavity specified/design width when installed with the cladding process • Ensure that cavity barriers are tightly fitted (timber) or under compression (mineral wool) and matched to the cavity width • Ensure cavity barriers are mechanically fixed to the structural frame in accordance with manufacturer's instructions 	
3	<p>Key points for intumescent cavity barriers</p> <ul style="list-style-type: none"> • Ensure that cavity barriers are tightly fitted and matched to the cavity • Ensure that cavity barriers are as specified and matched to the cavity width • Ensure cavity barriers are located at the edges of cavities • Intumescent cavity barriers to be mechanically fixed to the frame as given in the specification and manufacturer's recommendations • Do not pinch/over batten an intumescent cavity barrier • Do not install an intumescent cavity barrier if it is known the cavity is out of tolerance and wider than the intumescent is rated for • Ensure that intumescent expansion is not restricted 	

PROCESS	CARE POINTS	PHOTO / DIAGRAM / REFERENCE
4	<p>Tolerance of cavity barrier installation to be to the agreed strategy presented in the specification and drawings</p> <p>Confirm against design the acceptable tolerances</p> <p>Where no information is given a zero tolerance is to be followed</p>	 <p>The diagrams illustrate the required tolerances for cavity barrier installation. The top diagram shows a rectangular opening in a wall with a cavity barrier installed around it. Labels indicate 'Target zero tolerance tight fit' for the barrier against the wall, 'Wall', 'Opening', and 'Maximum 2mm gap' between the barrier and the wall. The bottom diagram shows a vertical party wall fire stopping. Labels indicate 'Party wall fire stopping target zero tolerance tight fit' for the barrier against the wall, 'Wall', 'Zero tolerance tight fit' for the barrier against the wall below the DPC, and 'Maximum 2mm gap' between the barrier and the wall below the DPC.</p>
5	<p>No gaps on installation of cavity barrier or fire stopping</p> <p>Key points:</p> <ul style="list-style-type: none"> • Ensure direct connection to the next cavity barrier • Do not allow gaps between barriers • Don't fit timber cavity barriers with gaps at joints • Junctions in barriers should be tightly butted or overlapped by min 150mm (one above the other) • Ensure mineral wool barriers are installed with insulation tightly butted together, not just polythene/sleeve abutting • Don't bend cavity barriers around corners - always work away with full lengths • As a general rule do not install cavity barriers directly onto OSB unless OSB is backed by solid timber <p>Follow manufacturer's installation instructions - if in doubt / absent instructions ask the designer for clarity</p>	 <p>The diagrams illustrate correct and incorrect installation methods for cavity barriers. The top row shows a plan or elevation view where a gap between two barriers is marked with a red 'X' and is incorrect, while a butt jointed connection is marked with a green checkmark and is correct. The middle row shows an elevation view where a wavy barrier with a gap is marked with a red 'X' and is incorrect, while a butt jointed connection with a length 'L' is marked with a green checkmark and is correct. The bottom row shows an elevation view where a barrier with a gap is marked with a red 'X' and is incorrect, while a butt jointed connection with a length 'L = 2x depth of barrier' is marked with a green checkmark and is correct. The bottom row also shows corner treatments: a corner with a gap is marked with a red 'X' and is incorrect, while a square butt jointed corner is marked with a green checkmark and is correct. Finally, a bent round barrier is marked with a red 'X' and is incorrect, while a butt jointed corner is marked with a green checkmark and is correct.</p>

NOTE:

1 The STA recommend that an installer adopt the training module and verification included within the Timber Frame Competency Award Scheme. Companies outside of the STA may still take the module as a demonstration of their competence to install cavity barriers.



6.5 Care points for structural timber frame erectors¹

PROCESS	CARE POINTS	PHOTO / DIAGRAM / REFERENCE
1	Agree with customer scope of responsibility for structure and cladding and where the care points for other trades are to be followed for compliance with cavity barrier and fire stopping installation	File written confirmation
2	Agree with customer who is responsible for installing cavity barriers	File written confirmation
3	Ask for details of cavity tolerance agreement and check compliance with specified cavity barrier width for tolerance of gap expected	Drawings should clearly show location and type
4	If installing cavity barriers agree installation method statement with designer for functional requirements	File written confirmation
5	If not installing cavity barriers, ensure confirmation of this is documented	Check frame tolerance before installing cavity barriers
6	<p>A) Stop installing cavity barriers if the structural frame is out of tolerance and agree cavity barrier widths needed to match the new gap present</p> <p>B) Ensure fire stopping and cavity barriers works at party walls does not continue until barriers/fire stopping is signed off as compliant with the specification</p>	 <p>STA Assure process label for STA installers</p>
7	Where responsible, sign off that cavity barriers are in place and not breached/absent or damaged before leaving the site - ensure STA compliance (or other recognised installer scheme) labels are in place	File written confirmation
8	Hand in fire stopping and cavity barrier compliance form signed and agreed to client	File written confirmation
9	Use digital photography to record evidence of all barriers and fire stopping installed. Issue customer with recorded evidence of what has been installed at handover	 Photo evidence needed

NOTE:

- 1 The STA recommend that an installer adopt the training module and verification included within the Timber Frame Competency Award Scheme. Companies outside of the STA may still take the module as a demonstration of their competence to install cavity barriers.



6.6 Care points for masonry cladding (brick, block and stone layers)¹

PROCESS	CARE POINTS	PHOTO / DIAGRAM / REFERENCE
1	<p>Key points for cladding:</p> <ul style="list-style-type: none"> • Cladding should be aligned to follow the line of the frame and maintain a reasonably constant cavity width • Adjustments to cavity barrier depths can then be agreed and carried out prior to the construction of the cladding • Cladding should follow the structural timber frame to maintain the cavity width. Taking a different alignment will create tolerance issues requiring changes in cavity barriers, wall ties and lintels 	If the structural frame is not to expected tolerance please consult the cladding engineer
2	Agree with the Principal Contractor who is responsible for installing cavity barriers	If to be undertaken by cladding company, ensure that training been given
3	Ask for details of cavity barriers/fire stopping that interfaces with masonry cladding/wall ties so process 4 & 5 can be fulfilled	 Project specific details required
4	If installing cavity barriers agree installation method with the Principal Designer	 Project specific details required
5	Stop work if cavity barrier missing and inform site manager - do not continue building without the cavity barrier in place	
6	Sign off that cavity barriers are in place and not breached/absent or damaged from masonry works	Project quality agreement with Principal Contractor
7	Hand in fire stopping cavity barrier compliance form signed and agreed to client	 Digital photographic record of cavity barriers installation
8	Recommend an agreed project compliance document is established to clearly show what good looks like and what unacceptable build looks like	

NOTE:

- 1 The STA recommend that an installer adopt an appropriate training module and verification procedure. Companies outside of the STA may still take the module as a demonstration of their competence to install cavity barriers.



6.7 Care points for external cladding installers¹

PROCESS	CARE POINTS	PHOTO / DIAGRAM / REFERENCE
1	Agree with the Principal Contractor who is responsible for installing cavity battens to support the cladding	If the structural frame is not to expected tolerance please consult the building designer
2	Agree with the Principal Contractor who is responsible for installing cavity barriers	If to be undertaken by cladding company, ensure that training been given
3	Ask the Principal Designer for details of cavity barriers that interfaces with cladding battens and cladding board so process 4, 5 and 6 can be fulfilled	 Project specific details required
4	If installing cavity barriers agree installation method with the principal designer	 Project specific details required
5	If not installing cavity barriers agree installation of battens/cladding past cavity barrier	 Project specific details required
6	Stop work if cavity barrier missing and inform site manager - do not continue cladding process without the cavity barrier in place Cavity barriers to fill cavity spaces where solid/mineral wool is used or be a compliant intumescent barrier	
7	Do not install battens over cavity barriers	 Project specific details required
8	Sign off that cavity barriers are in place and not breached/absent or damaged from cladding works	Project quality agreement with Principal Contractor
9	Hand in fire stopping cavity barrier compliance form signed and agreed with the Principal Contractor	 Digital photographic record of cavity barriers installation
10	Recommend an agreed project compliance document is established to clearly show what good looks like and what unacceptable build looks like	 

NOTE:

- ¹ The STA recommend that an installer adopt an appropriate training module and verification procedure. Companies outside of the STA may still take the module as a demonstration of their competence to install cavity barriers.

6.8 Care points for roofing contractors installing felt/battens and tiles¹

PROCESS	CARE POINTS	PHOTO / DIAGRAM / REFERENCE
1	Agree with the Principal Contractor who is responsible for installing fire stopping at party walls.	If the structural frame is not to expected tolerance please consult the building designer
2	Stop work if cavity barrier missing and inform site manager - do not continue process without the cavity barrier in place	
3	Agree the installation method with the Principal Contractor	 Project specific details required - see Part 4, Detail 11
4	Sign off that appropriate fire stopping or cavity barriers are in place and not breached/absent or damaged	Project quality agreement with Principal Contractor
5	Hand in fire stopping cavity barrier compliance form signed and agreed by the Principal Contractor to the client	 Digital photographic record of installation - specific item will be fire stopping below felt and fire stopping between felt and battens
6	Recommend an agreed project compliance document is established to clearly show what good looks like and what unacceptable build looks like	 

NOTE:

¹ The STA recommend that an installer adopt an appropriate training module and verification procedure. Companies outside of the STA may still take the module as a demonstration of their competence to install cavity barriers.

6.9 Care points for soffit eaves verge installers¹

PROCESS	CARE POINTS	PHOTO / DIAGRAM / REFERENCE
1	Agree with the Principal Contractor who is responsible for installing eaves cavity barriers, party wall vertical cavity barriers and fire stopping at box eaves details	If the structural frame is not to expected tolerance please consult the building designer
2	Ask for details of cavity barriers that interfaces with soffits especially the boxed eaves fire stopping so follow on processes can be fulfilled	
3	Agree the installation method with the Principal Contractor	
4	Stop work if cavity barrier or fire stopping at boxed eaves is missing and inform site manager	
5	Sign off that cavity barriers are in place and not breached/absent or damaged	Project quality agreement with Principal Contractor
6	Hand in fire stop cavity barrier compliance form signed and agreed by the Principal Contractor to the client	 Digital photographic record of cavity barriers installation
7	Recommend an agreed project compliance document is established to clearly show what good looks like and what unacceptable build looks like	

NOTE:

¹ The STA recommend that an installer adopt an appropriate training module and verification procedure. Companies outside of the STA may still take the module as a demonstration of their competence to install cavity barriers.

7. Appendices

Appendix 1: Terms used in this document

What is a cavity in a building structure?

A space enclosed by elements of the building fabric, for example facade cladding and timber frame structure. Also a cavity formed by two elements such as the middle of a party wall.

What is a cavity barrier?

A product that closes or subdivides a concealed cavity and inhibits the spread of fire (smoke and flames) within or into a cavity; inhibiting is to slow the spread of fire over a time period. See Table 1.1 for fire performance requirements.

Element of structure in a timber frame

Typically a load bearing wall, column, floor or beam in a timber frame structure.

Fire stopping for elements of structure, or fire compartmentation

Fire stopping is a product that closes a gap or imperfection in a fire resisting element of structure or compartment lining and has at least the same fire resistance. Fire stopping may be needed also to complete a line of fire compartmentation.

***NOTE:** A cavity barrier is not fire stopping unless it is designed for that function. However, fire stopping can achieve cavity barrier functionality if it closes a cavity.*

Fire compartment

A form of construction that creates a clear division within a building or is the building itself. The compartmentation construction is to stop the spread of fire beyond the compartment, be it in the building or outside of the building to an adjoining building, for a reasonable time.

Fire resistance of an element of structure, or fire compartmentation

The term is generally used in regulation guidance to describe the performance under a standard test condition to achieve a requisite number of minutes of resistance in the test before failure.

The term can also be used in fire engineering to describe the calculated fire performance based on design standards and actual fire data to provide a designed fire performance of the building, where the performance criteria is set against the test standard.

Appendix 2: Cavity barrier regulation guidance

Statutory regulation guidance allows Principal Designers on common building situations to adopt principles to achieve Building Regulation functional requirements without further design justification. The current regulation guidance for cavity barriers minimum test evidence is as noted in Table A1.1. Such test evidence, specific to the end use application, should be from an appropriate third party audited test facility.

TEST VALIDATION (BOTH SIDES SEPARATELY) England Approved Document B (ADB)		
FIRE RESISTANCE PERFORMANCE TEST MINIMUM VALUES	BS476 TEST*	EN 13501-2 COMPLIANCE
	30 minutes integrity 15 minutes insulation	30 minutes integrity (E 30) 15 minutes insulation (I 15)

Table A2.1: Cavity barrier test validation with Building Regulation Guidance in England, Approved Document B, current as of December 2022

* Readers should check if this older code is still acceptable for Building Regulation approval.

NOTES:

- a) EN 13501-2 [10] classification is referenced as this is how regulation approved guidance states the requirement. EN 13501-2 addresses cavity barriers under linear joint seals which links to fire tests EN 1366-4 [11], Fire resistance tests for service installations, Part 4: Linear joint seals. However, intumescent cavity barriers are tested under ASFP TDG19 [12] and typically accepted by warranty and approval bodies when tested at UKAS accredited test houses. TDG19 is for open state cavity barriers, not originally covered by EN1366-4[11], however, open state cavity barriers will be covered in the new standard prEN1364-6 [13] that will replace TGD19.
- b) For Scotland the test validation is for 30 minutes integrity only and for horizontal barriers tested from underside only.
- c) Scotland Technical Handbook [6] clarification of cavity barriers in external compartment wall junctions; the cavity barrier may remain at 30 minutes integrity validation provided the fire from inside the building is compliant with 60 REI at the floor and wall interface such that the fire from inside the room cannot spread from one compartment to the next, either by passing the cavity barrier or that the cavity barrier itself cannot be used as the resistance compartmentation (cavity barriers are not the same as fire resistance of compartment walls). See STA Technical Note 32 [14] and STA Insight 1 [17].

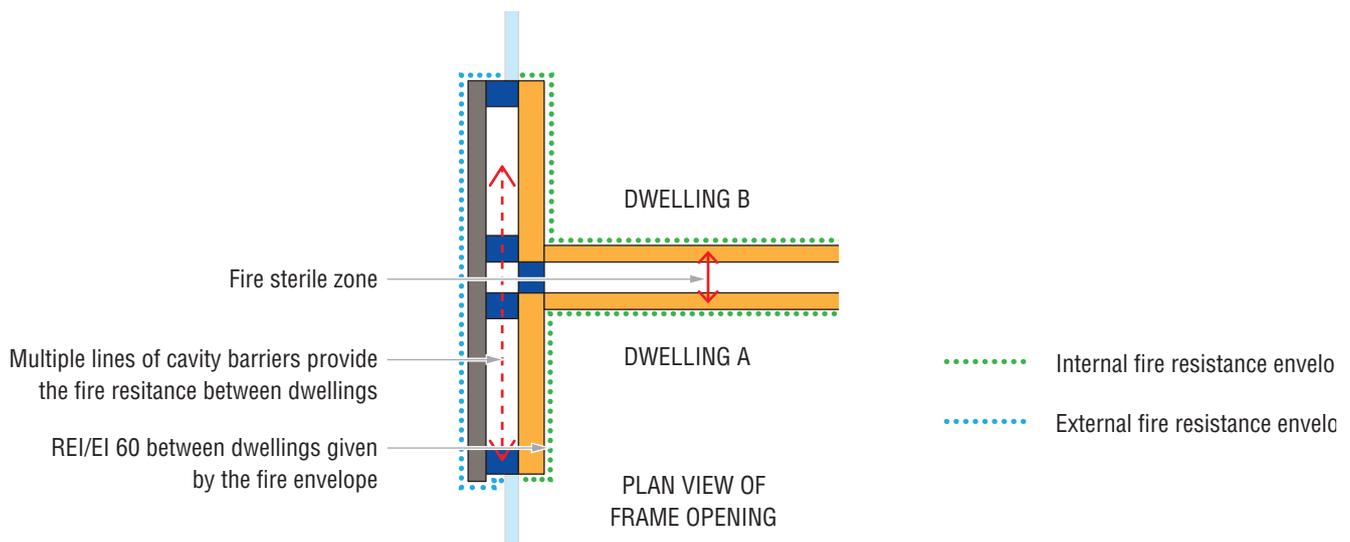


Figure A2.1: Plan view of fire resistance envelope at a party wall junction with an external wall

NOTE:

Fire stopping may be required at junctions of the linings where a break in the fire protection line cannot be justified.



Appendix 3: Cavity barrier and fire stopping compliance

General

A test report should record the minimum section size and type of timber that can be used; this will ensure that the approval bodies may see that an application is suitable for the intended purpose in a structural timber wall (timber frame or SIP). This is in addition to the extended application of the facade/cladding type e.g. masonry +cavity +timber frame, or cement board cladding +cavity +timber frame and timber-to-timber cavity condition.

Timber to façade cavity locations

The cavity barrier and fire stopping should be tested between the variety of masonry facades and cladding types being specified for a project (or with cladding types that are similar or worse performing) and a timber element of the same timber type and (at minimum) as deep as the thickness being used on the project (in terms of softwood or hardwood, with softwood test being acceptable for hardwood applications but not vice-versa). Note that it is common practice to test using orientated strand board (OSB) as representation of the timber structure, such as solid timber/glulam/ CLT etc. as OSB has a higher burn rate than solid timber

Timber-to-timber cavity locations

The cavity barrier and fire stopping is to be verified for its use between timber-to-timber application. There may be test data that has shown the performance of the barrier with a timber substrate similar or worse than the intended application, from which justification might be provided and the use of fire engineering to account for the behaviour of the timber substrate under the fire condition being considered.

Tested fire stopping

Fire stopping to be tested to provide the same fire resistance function as the element of structure where the gap is present.

Tested cavity barrier

Cavity barrier to be tested or otherwise demonstrated to provide the fire resistance required in the design of the building which must be to a minimum as noted in the statutory guidance.

Increased cavity barrier fire resistance

For buildings in certain situations where the cavity barrier around openings may require increased fire resistance to that detailed in current statutory guidance. EI values of 60 minutes may be necessary for multi-occupancy buildings.

Building physical inputs

A cavity barrier or fire stop may require consideration for the impact on thermal bridging or acoustic performance. Cavity barriers should not be used as an element of structure.

Generic cavity barrier compliance table

COMPLIANCE AND APPLICATION	
INSTALLATION REQUIREMENTS	<p>Tight fitting to the surfaces of the cavity space</p> <p>The cavity barrier generic installation is between at least one combustible surface such as the timber frame</p> <p>If a non-combustible board is present over the timber frame, then the depth of board to which the cavity barrier is fixed shall demonstrate durability to be unaffected by a fire of equal intensity for the EI 30/15 fire condition.</p> <p>The cavity barrier shall be mechanically fixed to the supporting element or demonstrated how it can be secured within the cavity and perform its function during a fire - and during its lifetime, with due consideration to allow for predicted movement of the supporting timber structure and cladding.</p> <p>External cavity wall notes</p> <ol style="list-style-type: none"> 1. Products may, depending on their type, require a damp-proof membrane at an interface with and external wall cladding 2. Where installed, DPC and cavity trays are not considered to provide the functional requirement of the cavity barrier 3. The design shall consider where free flow of air may be required in the cavity space for external walls and roofs to avoid condensation. 4. External walls may require thermal bridging check 5. A cavity barrier may be formed by a construction element provided for another purpose if it achieves the required fire performance
DEEMED TO SATISFY CAVITY BARRIERS AS NOTED IN CURRENT STATUTORY GUIDANCE See references [5], [6], [8], [9].	<ol style="list-style-type: none"> a Steel, a minimum of 0.5mm thick b Timber, a minimum width of 38mm thick (height of timber resisting the fire in the cavity) c Polythene-sleeved mineral wool, or mineral wool slab, under compression when installed in the cavity d Calcium silicate, cement-based or gypsum-based boards, a minimum of 12mm thick

Table A3.1: Cavity barrier generic compliance under Building Regulation statutory guidance³

NOTES:

- 1 *Designers shall check the current regulation and statutory guidance at the time of design and build as changes may have occurred since the writing of this document.*
- 2 *The statutory guidance states the deemed to satisfy requirements for cavity barriers in stud walls and partitions and also around openings. The STA consider that this can also be applicable to horizontal and vertical compartmentation applications, subject to the fire safety strategy which may require additional fire stop requirements. Designers and specifiers using solid timber battens may have joints in the length. The designer shall satisfy themselves that the size and thickness of the materials and joints in such cavity barriers are correctly detailed and installed, so to fulfil their function. The use of steel cavity barriers is not recommended without the use of a secondary barrier to provide insulation resistance, stopping the spread of heat through a steel cavity barrier. The use of an appropriate intumescent on steel may, with tested evidence, fulfil this function.*
- 3 *The selection of a cavity barrier should be based on the anticipated quality of build and tolerances involved. Where timber battens are used, the choice of tolerance filler on masonry should be carefully detailed and robust.*

Appendix 4: Cavity barrier options for the external wall cavity

Product options between the structural frame and external cladding, including masonry façade.

PRODUCT TYPE	HOW THEY WORK	BENEFITS	POINTS TO CONSIDER
MINERAL WOOL (STONE) PLASTIC SLEEVED "SOCKS"	Under the designated compression and with the tolerance of the cavity barrier they can provide a tight fit	Ease of site fitting Easily identified Available in different sizes to suit site or design conditions	Butt tight joints required with no significant gaps ¹ Sleeve tail lapped under breather membranes To be communicated with follow on trades: <ul style="list-style-type: none"> Cladding to follow the line of the structural frame walls, not independent of structural wall or significant tolerance gaps can occur² between the cladding and the frame To be installed as a compression fit to product design. (refer to manufacturer) Not to be compressed by lightning earthing strips or any battening, to be under compression against cladding to close cavity Check if product provides cavity tray function / or provide cavity tray plus weep holes
SOLID TIMBER BATTENS	Fully fill gap or where tolerance is required make up tolerance with suitable robust filler ³	Can be factory fitted or site fitted	Butt tight joints required with no significant gaps ¹ DPC layer to external cavity faces Cavity tray at horizontal members needed plus weep holes Min. size to be cavity width (less tolerance) and 38mm thick in direction resisting the fire (parallel to the facade) Filler to cladding tolerance gaps to be mortar or mineral wool
STEEL PLATES⁴	Plates fitted across the full width of cavity	Supplied and fitted by cladding company ² Ease of passing through cavity insulation	Corrosion resistance specification to environment to which it is exposed Minimum thickness to design - EI fire engineered solution required Lapped joints with no significant gaps ¹ To be communicated with follow on trades: <ul style="list-style-type: none"> Cavity tray/weep holes at horizontal members needed
INTUMESCENT STRIP "OPEN STATE BARRIERS"^{5,6}	Strip fitted to one leaf. When a fire occurs the heat activates the product to expand and fill gap	Can be factory fitted or site fitted Removes need for cavity tray and weep holes	Tolerance limited to type of intumescent strip used ² Can be used with solid timber or mineral wool socks for large cavity widths ² Mechanically fix to structure Butt tight joints required with no significant gaps ¹ To be communicated with follow on trades: <ul style="list-style-type: none"> Not to be covered e.g. by battens, lightning rods, services Declared durability of the product to be matched to cladding

Table A4.1: Cavity barrier product options - external walls

NOTES:

- 1 *'No significant gaps' means contact of surfaces, relevant to the material type and cavity barrier product manufacturer's guidance or tested evidence of acceptable gaps. In the absence of information the barriers are to be reasonably tight fitting.*
- 2 *Cladding; the gap between the structural frame and cladding inside face is to be closed by the barrier/eventual closure with intumescent band barrier in the event of a fire.*
- 3 *A suitable filler is one that can be demonstrated to be robust against expected movement and not fall out after drying out. Mortar is to be used with a DPC and be keyed into the masonry bed joints of the reveal. The gap filled by mortar may be limited to 15mm maximum, subject to approval of the designer.*
- 4 *The use of steel cavity barriers is not recommended without the use of a secondary barrier that provides insulation resistance to stop the spread of heat through a steel cavity barrier. The use of an appropriate intumescent on steel can fulfill this function.*
- 5 *Open state cavity barriers. Association for Specialist Fire Protection (ASFP) define these as barriers that allow ventilation and drainage in the cold state, but which close in a fire. Note that building control approval is required for the durability of the barrier, for the appropriate cladding and maintenance design life.*
- 6 *For tested elements designers should check guidance for minimum compliance.*

Appendix 5: External cavity barrier suitability check

Suitability guidance for cavity barriers between the structural frame and external cladding (including masonry facade). Guidance solutions to be matched to the design life of the cladding.

SOFT CAVITY BARRIER BAND	RIGID CAVITY BAND	FIRE REACTIVE CAVITY BAND
MINERAL WOOL SOCKS GOOD IF WITHIN TOLERANCE OF THE CAVITY AND COMPRESSED	TIMBER BATTENS GOOD IF TOLERANCE TAKEN UP BY ROBUST FILLER	INTUMESCENT BAND GOOD IF DESIGN ACCOUNTS FOR CLADDING TYPE AND TOLLERANCE OF CAVITY GAP
Not tolerant of weather damage or light abuse during the construction process - easily dislodged	Tolerant of weather damage or light abuse during the construction process	Tolerant of weather damage or light abuse during the construction process
Cladding to be aligned to the tolerance of assembly of the structural frame from direct measurement from the frame	Acts as a guideline for cladding to be aligned to the tolerance of assembly of the structural frame	Allows cladding to be aligned to the tolerance of assembly of the structural frame from direct measurement from the frame
Limited tolerance of cavity width - must be under compression to manufacturer's requirements	Tolerance of cavity width - must be taken up by robust filler that can accommodate normal building movements	Tolerance to be included in the design selection of the barrier, in so much that the expandability of the strip to be at the limits of acceptable cavity tolerance

Table A5.1: Cavity barrier suitability for external wall cavity conditions

NOTE: All cladding alignment should follow the timber frame alignment to maintain cavity width

Openings in fire resistant in external elements of structure (walls, floors and roofs)

Where an opening occurs, or gaps, in a fire resisting element of structure lining then a cavity may be exposed as well as the timber and insulation materials that make up the element assembly. There are two factors to address; closure of the cavity that is exposed by the opening and also completion of the fire resistance inside and around the opening to ensure there is no breach of the fire resistant opening. Exceptions to this may be partial openings such as electrical sockets, which may be left under current statutory guidance, which allows these to be left without fire resistant backing. The STA have demonstrated that electrical sockets in EN1365 wall tests has no impact on the fire resistance of the assembly, but it is recommended that fire stopping behind service penetrations such as plug and light sockets is carried out for future proofing the structure against possible enhancements of the statutory guidance as increasing safety is requested.

Key points

1. Ensure any opening does not cause an imperfection in the fire resistance line of the elements of structure or provide fire stopping at the gap formed.
2. A cavity barrier is not fire stopping unless designed and tested for that purpose.
3. Timber elements in the frame can be used to provide fire stopping conditions but only if joints do not create gaps for hot gasses to pass. The EI value of the timber may be demonstrated in a residual section of robust timber after a duration of fire time exposure.
4. Drylining, where used as fire resistance barrier/effective fire stopping, may be used to bridge a gap (e.g. window reveal), providing there is no free edge, unless tested in this condition, or that a free edge does not cantilever more than the board thickness.
5. Junctions to window/door frames and fire lining/fire stopping element should be sealed with a fire resisting sealant suitable for the fire resistance requirement, materials and gap present.
6. The cavity barrier at the head of the window/door and the reveal must be tightly connected. Use of steel lintels to be checked for absence of gaps and open ends that may allow fire to spread.
7. A window/door frame may be used (if data available) to justify it as a cavity barrier, only if it closes the cavity.

Appendix 6: Cavity barrier options for internal wall cavity

Product options for between the structural frames in compartment walls, ceilings, spandrels and floor zones (excludes fire stopping)

	PRODUCT TYPE	HOW THEY WORK	BENEFITS	POINTS TO CONSIDER
MOST LIKELY OPTION	MINERAL WOOL PLASTIC SLEEVED "SOCKS", OR UNBAGGED PRODUCT	Under compression they provide a tight fit between the compartment wall elements (walls, floors, ceiling, roof)	Site fitted as work progresses or follow on trades where access is available	To be installed as a compression fit to product design Typically compressed (see manufacturer's requirements) Butt tight joints between lengths required with no significant gaps ¹ Full filled compartment walls will have inherent cavity barriers ⁴
	SOLID TIMBER BATTENS	Fully fill gap or where tolerance is required make up tolerance with suitable filler e.g. mineral wool	Can be factory fitted or site fitted	Tolerance gaps filler to be considered and checked ² Butt tight joints required with no significant gaps ¹ Minimum size to be cavity width (less tolerance) and 38mm thick ⁵ in direction resisting the fire (parallel to the facade)
	STEEL PLATES⁶	Plates fitted across the full width of cavity	Site fitted	Minimum 0.5mm thick ^{2,6} Lapped joints required with no significant gaps ¹ Only to be used with clear justification
LEAST LIKELY OPTION	INTUMESCENT STRIP	Strip fitted to one leaf. When a fire occurs the heat activates the product to expand to fill the gap	Can be factory fitted or site fitted	Tolerance limited to type of intumescent strip used ² Can be used with solid timber or mineral wool socks for specific cavity widths ² Mechanically fix to structure; one of the leaves that form the cavity Butt tight joints required with no significant gaps ¹ To be matched to the design life of the structural element Only to be used with clear justification

Table A6.1: Cavity barrier suitability for internal wall cavity conditions - see Note 7 where fire stopping is required

NOTES:

- ¹ 'No significant gaps' means contact of surfaces, relevant to the material type and cavity barrier product manufacturer's guidance or tested evidence of acceptable gaps. In the absence of information the barriers are to reasonably tight fitting.
- ² The gap between the structural frame elements is to be fully closed by the barrier under compression/eventual closure with intumescent band barrier in the event of a fire.
- ³ For tested elements, designers are to check current Statutory Guidance for requirements.

- 4 *Compartment wall fully filled with mineral (party wall glass or stone) wool creates conditions where no cavity exists and fulfills the function of a cavity barrier in a party/compartment wall.*
- 5 *Designers shall check the current regulation at the time of design and build as changes may have occurred since the writing of this document.*
- 6 *The use of steel cavity barriers is not recommended without the use of a secondary barrier that provides insulation resistance to stop the spread of heat through a steel cavity barrier. The use of an appropriate intumescent on steel can fulfill this function with test data to support its application.*
- 7 *Fire stopping provides continuity of the fire compartmentation where imperfections, services or junctions are present and at the top junction of a party wall compartment wall where there is a junction with the roof.*

Internal wall cavity between structural frame elements

Soft cavity barrier band	Rigid cavity band*	Fire reactive cavity band
MINERAL WOOL SOCKS GOOD IF WITHIN TOLERANCE	TIMBER BATTENS GOOD IF TOLERANCE TAKEN UP BY FILLER	INTUMESCENT BAND GOOD IF DESIGN ACCOUNTS FOR TOLERANCE OF GAP
Tolerance gap not likely to be significant on an internal cavity frame - under control of the structural timber assembler.		
Ease of fitting	Only for specific applications Uncommon in use and not for any acoustic condition	Difficult to site fit and unlikely to be a solution without clear justification Tight tolerance for factory fit To be matched to the design life of the structural element

Table A6.2: Cavity barrier suitability for internal party walls or floor cavity conditions (excludes fire stopping barrier requirements around party wall compartmentation when needed)

* Limited applications in a cavity between structural timber elements due to acoustic transfer; checks needed if compliant to aspects other than fire.

Appendix 7: Cavity barrier research by Milner Associates

Research carried out on cavity barrier performance to BS/ EN benchmark testing. Testing carried out:

BS 8414 test carried out at Efectis for a masonry outer skin to a standard timber frame with timber cavity battens used around the opening of the fire source.

Two sets of EN 1366-4:2021 at Warrington carried out on timber cavity battens and stone wool cavity socks. Both horizontal and vertical testing were undertaken.

EN 1366-4:2021 test furnace



Vertical samples prior to testing



Vertical samples on removal from furnace



Horizontal samples



Test stopped at 66 mins

Summary results for solid timber battens C16

APPLICATION	CAVITY BARRIER PRODUCT	TEST	TESTED AGAINST	OUTCOMES
VERTICAL ORIENTATION	50mm wide by 38mm deep C16 timber batten Butt jointed	BS EN 1366-4 (see figure A7.1) <i>WF Report No: 522529/R</i>	Masonry one side Full timber frame assembly OSB sheathing and glass wool insulation	EI 66/66
		BS 8414 test - application at opening reveal (see figure A7.3) <i>Classification report: EUI-20-000209</i>		Batten provided resistance against fire spread through the test duration
HORIZONTAL ORIENTATION	50mm wide by 38mm deep C16 timber batten Butt jointed	BS EN 1366-4 (see figure A7.1/A7.2) <i>WF Report No: 540246</i>	Masonry one side Full timber frame assembly OSB sheathing and glass wool insulation	EI 66/66
		BS 8414 test - application at underside/lintel blocking (see figure A7.3) <i>Classification report: EUI-20-000209</i>		Batten provided resistance against fire spread through the test duration

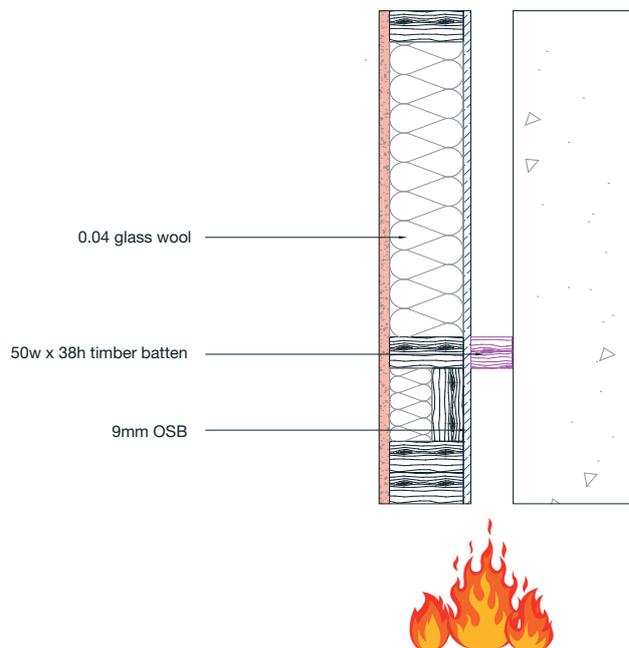


Figure A7.1: Vertical fire test for timber batten window reveal or party wall condition (EI 66 outcome)

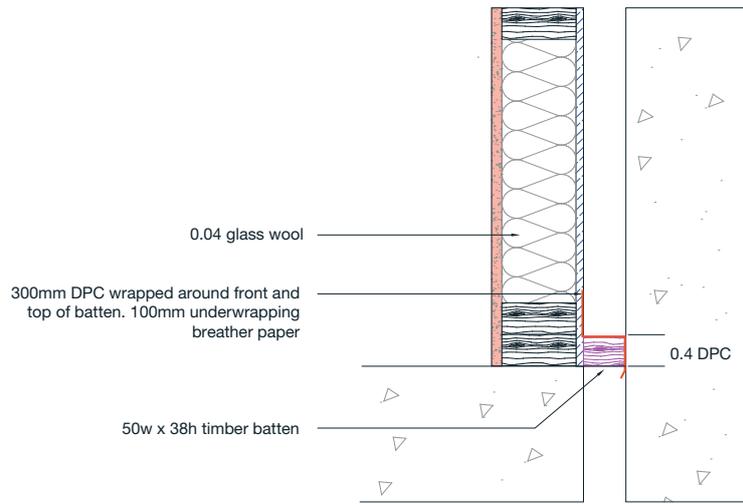
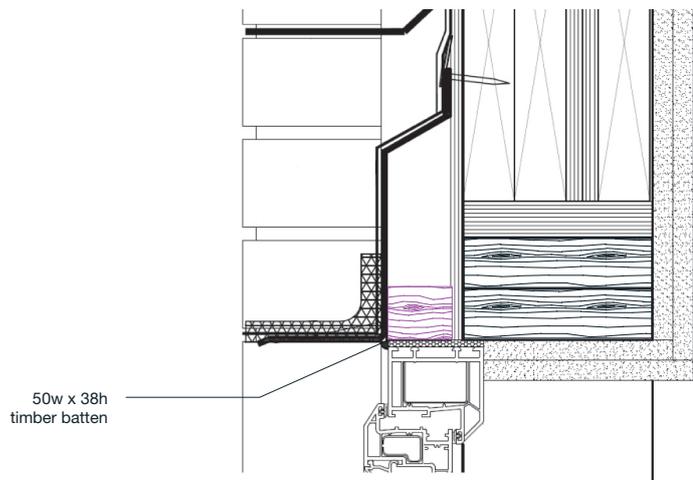
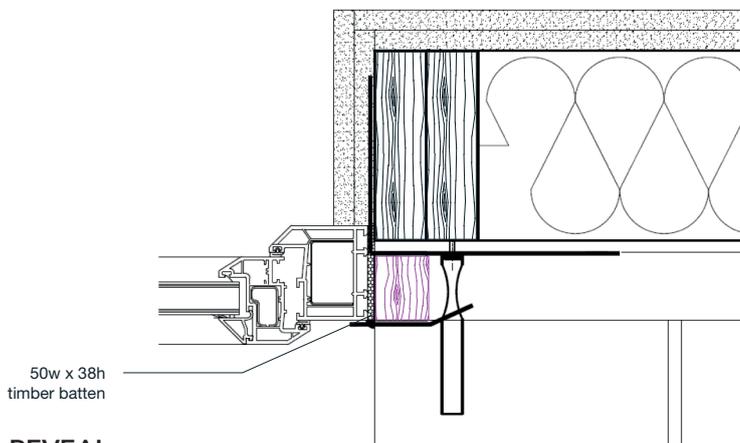


Figure A7.2: Horizontal fire test for timber batten simulating floor zone condition or window lintel (EI 66/66 outcome)



HEAD OF OPENING



REVEAL



Figure A7.3: Horizontal and vertical fire test for timber batten within the BS8414 test which is a full fire condition of fire from a compartment emitting out of a window

Summary results for stone wool-filled polyethene sock

APPLICATION	CAVITY BARRIER PRODUCT	TEST	TESTED AGAINST	OUTCOMES
HORIZONTAL BATTEN	63mm wide by 65mm deep Stone wool 43kg/m ³	BS EN 1366-4 (see figure A7.4) WF Report No: 522529/R	Masonry one side Full timber frame assembly OSB sheathing and glass wool insulation behind sheathing	EI 66/64
		BS EN 1366-4 (see figure A7.4)	Masonry one side Full timber frame assembly OSB sheathing and PIR insulation behind sheathing	EI 66/55
VERTICAL CONDITION	63mm wide by 65mm deep Stone wool 43kg/m ³	BS EN 1366-4 (see figure A7.5) WF Report No: 522529/R	Masonry one side Full timber frame assembly OSB sheathing and PIR insulation behind sheathing	EI 66/66
		BS EN 1366-4 (see figure A7.6) WF Report No: 522529/R	Solid timber backing Full insulation in party wall	EI 66/28

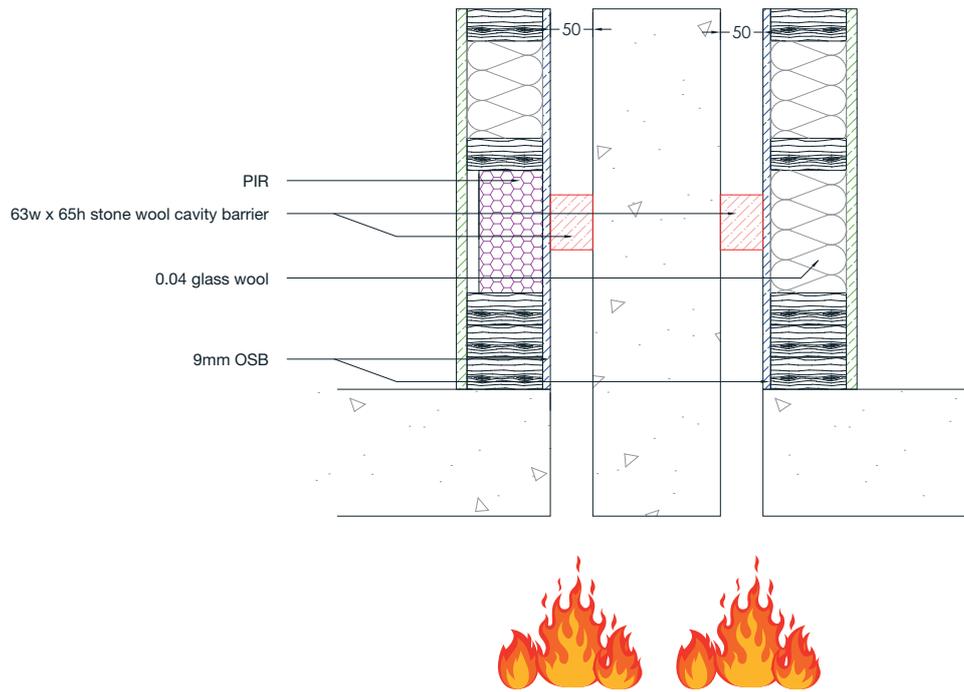


Figure A7.4: Horizontal fire test for stone wool cavity barriers without solid timber backing behind the OSB sheathing - simulating an eaves timber frame cavity barrier condition. PIR (EI 66/55 outcome) and glass wool (EI 66/64 outcome) insulation

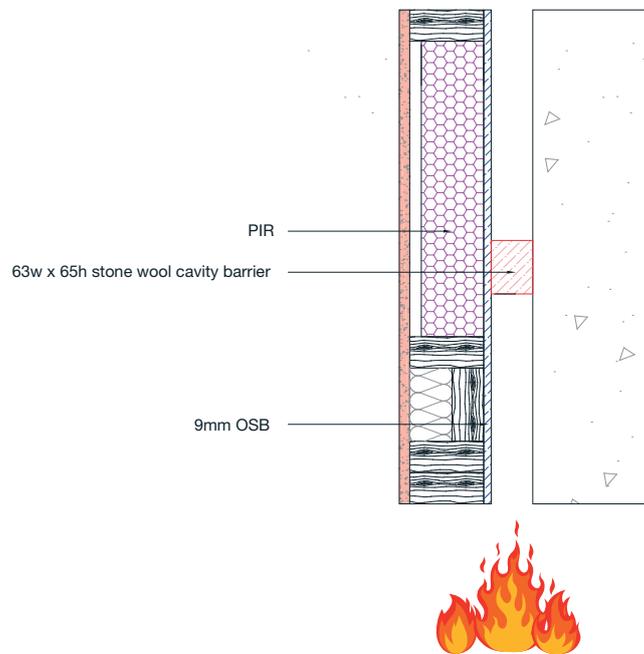


Figure A7.5: Vertical fire test for stone wool cavity barriers without solid timber backing behind the OSB sheathing (EI 66/66 outcome)

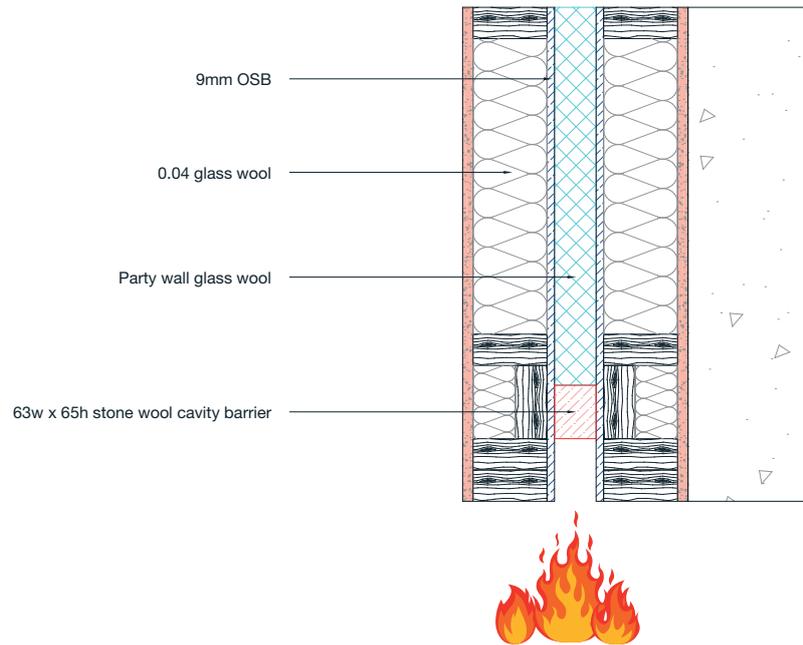


Figure A7.6: Vertical fire test for stone wool cavity barriers as a party wall condition (EI 66/28 outcome)

8. References and additional information

8.1 References

- [1] STA Technical Note 12 - cavity Barriers around openings, available to members only at www.structuraltimber.co.uk
- [2] STA Technical Note 31- vocabulary of roles in a timber building project, available to members only at www.structuraltimber.co.uk
- [3] STA Cavity Barrier Guidance document - installation aid for site, available at www.structuraltimber.co.uk
- [4] HM Government, The Building Regulations 2010 (England), www.planningportal.gov.uk
- [5] England Building Regulations, Approved Document B, 2010 Vol 1 & 2 - March 2024 updates, www.planningportal.gov.uk
- [6] Scotland Building Standards Technical Handbook Section 2 - 2022, Scottish Building Standards Agency, www.gov.scot
- [7] STA Advice Note 7.3 - fire safety strategy (FSS) for structural timber buildings, available at www.structuraltimber.co.uk
- [8] Welsh Government, The Building Regulations 2010 (Wales), www.gov.wales
- [9] Northern Ireland, Department of Finance, The Building Regulations 2012 (Northern Ireland), Technical Booklet, www.finance-ni.gov.uk
- [10] EN 13501-2 2016, Fire classification of construction products and building elements. Classification using data from fire resistance tests, excluding ventilation services, BSI
- [11] EN 1366-4, Fire resistance tests for service installations, Part 4: Linear joint seals, BSI
- [12] ASFP TDG19 2017, Fire resistance test for 'open-state' cavity barriers used in the external envelope or fabric of buildings, www.asfp.org.uk
- [13] prEN 1364-6, Fire resistance tests for non-loadbearing elements, Part 6, Cavity Barriers, CEN
- [14] STA Technical Note 32 - update on Technical Handbook Section 2 for structural timber buildings 2020, available to members only at www.structuraltimber.co.uk
- [15] STA cavity barrier installer training manual, available to members only at www.structuraltimber.co.uk
- [16] STA cavity barrier installation poster, available to members only at www.structuraltimber.co.uk
- [17] STA Insight 1 - fire safety of external walls

8.2 Building Regulation guidance

England & Wales, Building Regulations, Approved Document B, Parts 1&2

Scotland Scottish Standards Section 2 - 2019

Building Regulations (Northern Ireland), Guidance Technical Booklet E

HM Government, The Building Regulations 2010 (England), Approved Documents Available at: www.planningportal.gov.uk

Welsh Government, The Building Regulations 2010 (Wales) Available at: <http://gov.wales>

Scottish Building Standards Agency, The Building (Scotland) Regulations 2004, Technical Handbook Available at: www.gov.scot

Northern Ireland, Department of Finance, The Building Regulations (Northern Ireland) 2012, Technical Booklet Available at: www.finance-ni.gov.uk

A vertical bar with a color gradient from orange at the top to dark teal at the bottom.

Head office

Structural Timber Association
The e-Centre
Cooperage Way
Alloa
FK10 3LP

t: 01259 272140

e: office@structuraltimber.co.uk

w: www.structuraltimber.co.uk