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Structural timber buildings fire safety in use guidance Volume 2 - Cavity barriers and fire stopping

STA fire safety research and guidance project

Version 2.0 - June 2021



Introduction

The Structural Timber Association's objective in developing this guidance is to provide solutions for cavity barrier installations and a clear understanding of who is responsible for design, installation and checking. Consideration has been given to industry good practice and the best-in-class solutions are included within this guidance, 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 (Oregon Timber Frame Ltd), Steve Griffiths (Taylor Lane), Darren Jarman and Kevin Hurst (Lowfield Timber Frame), John Simpson and Stewart Dalgarno (Stewart Milne Timber Systems), Nick Worboys and Geoff Arnold (Pinewood Structures Ltd) and Andrew Orriss (Structural Timber Association).

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Structural timber buildings fire safety in use guidance

Volume 2 - Cavity barriers and fire stopping to elements of structure

Technical advice to support designers, installers and checkers to achieve resilient fire safe structural timber buildings

Scope of document (Parts 1-5)

To provide clarity on the location and detailing for cavity barriers in dwelling houses for single occupancy and multi occupancy blocks.

Part 1: Functional requirements of cavity barriers

Part 2: Responsibility for installation

Part 3: Cavity barrier locations

Part 4: Good practice details

Part 5: Installation care points

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]

Who should read this?

Principal designers, building designers, architects, specifiers, contractors, third party inspectors, structural timber suppliers.

Who should follow the guidance and who is responsible?

This guidance is relevant for all projects in the design process from 1st September 2021.

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

The guidance presented follows STA industry reviews of design and 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.

The STA recommendation is to follow this guidance, even though it may be in addition to what other guidance documents require. In doing so the STA is futureproofing its buildings for fire safety, so that the benefits of energy efficiency and the speed of construction can be realised with inherent fire safety.

Revision history

Version 1.0 - Feb 2020 (first edition)

Version 2.0 - June 21

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



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Part 1 - Functional requirement of cavity barriers

Terms and understanding

What is a cavity barrier?

A product that closes or subdivides a concealed cavity and inhibits the spread of fire across or into a cavity; inhibiting is to slow the spread of fire over a time period. See table 1.1 for fire resistance requirements.

Fire stopping for elements of structure

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 as the function requirement in which it is located.

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 resistance of an element of structure

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.

Elements of structure

The part of the building that provides support or compartmentation for a building. The element of structure is typically a combination of products to form the assembly be it a wall, floor or ceiling and roof.

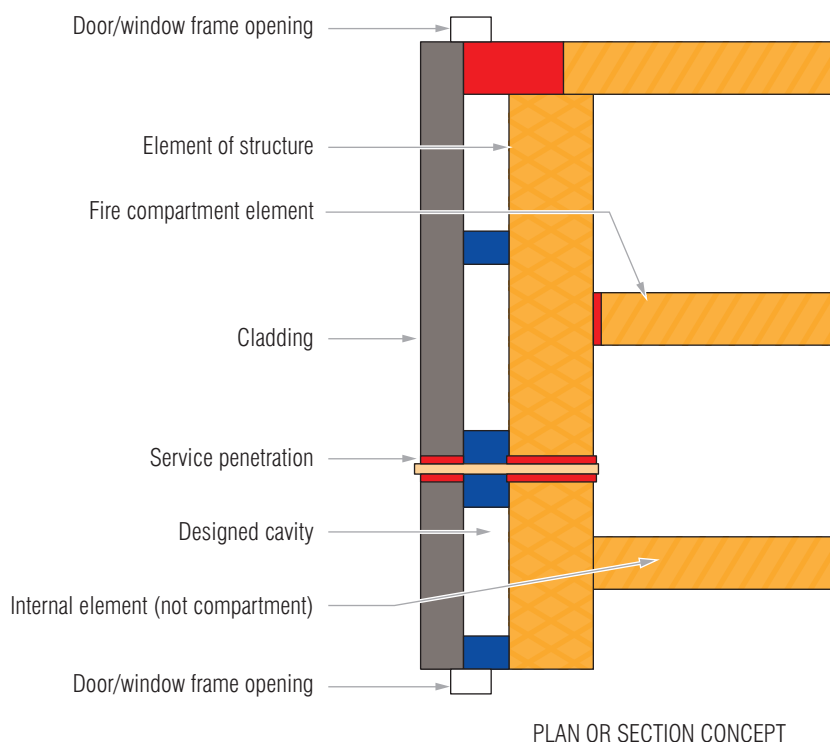


Figure 1.1: Generic cavity detail

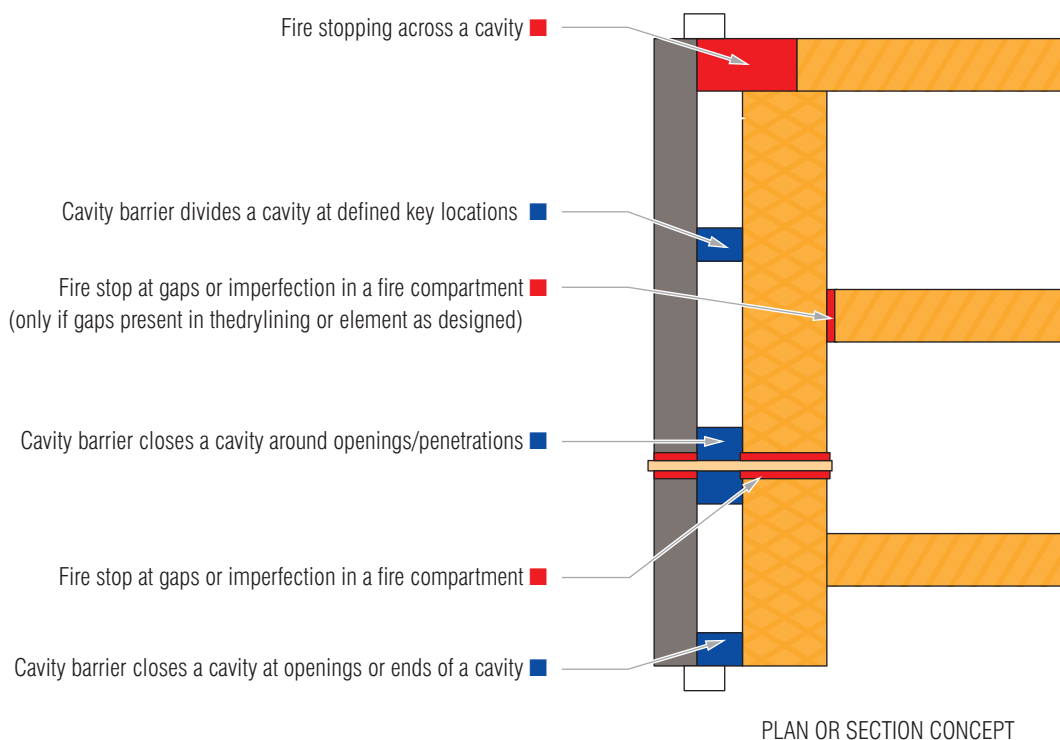


Figure 1.2: Cavity barrier and fire stopping locations

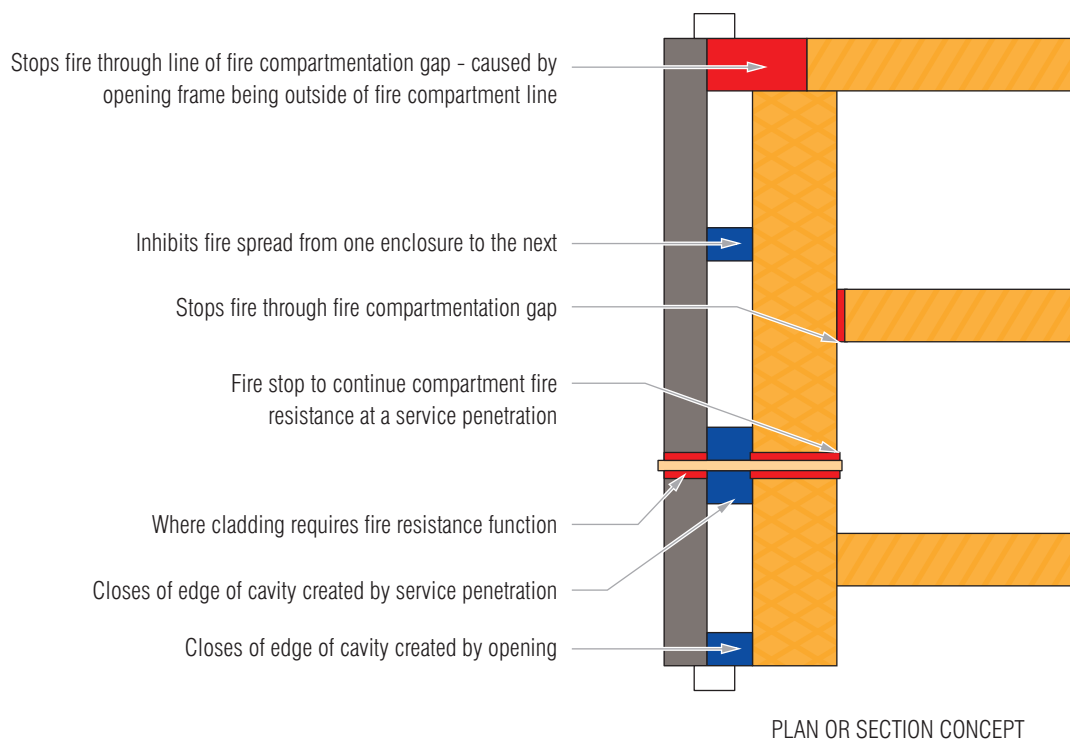


Figure 1.3: Cavity barrier and fire stopping notes regarding function



Cavity barrier products and requirements

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 designer of the building (which is directed or undertaken by the principal and or building designer) shall decide how this is achieved.

Statutory Guidance documents, for example Approved Document B (England) [5] 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, that may fall under the design, supply or install of a structural timber building company.

The principal designer manages the building designer and other parties with design responsibility to ensure that the Building Regulation requirements are achieved. The STA recommend the locations and installation approach for cavity barriers contained in this guidance, as this addresses a practicable and resilient level of fire safety. The guidance is for 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 as to the technical requirements needed to comply with the fire resistance, building stability and cavity enclosure fire robustness required.

The STA recommend that a Fire Safety Strategy, as outlined in the STA Advice Note 7.3 - Fire Safety Strategy (FSS) for structural timber buildings [7] is undertaken by the project design team on all projects to determine and outline the technical functions for fire safe buildings.

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].

ENGLAND: REGULATION B3 [4]	SCOTLAND: STANDARD 2.4 [6]
<p>Internal fire spread (structure)</p> <p>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]</p> <p>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>Northern Ireland and Wales - as England</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>

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



Cavity barrier key points

1. The cavity barrier functional objective is to delay the spread of fire not to necessarily stop it; delaying spread from beyond the point of origin. Therefore there is a time requirement, which can be found in the appropriate country's statutory regulation guidance.
2. A cavity barrier's location is dependent on the use of the building, its size, and on the location in the building.
3. When fire occurs in a building, a vented cavity can act as a chimney drawing up smoke and flames into the cavity.
4. Gaps of consequence in a cavity barrier may allow fire to spread between the gaps, particularly if there is an air draw through the gap.
5. In the absence of data all cavity barriers are to be close fitting to remove gaps and in accordance with the barriers manufacturer's recommendations.
6. The location and product design falls under the principal designer's responsibility.
7. The design and installation of the cavity barrier shall follow the care points list presented by the STA (see Part 5).
8. Installation of the cavity barrier shall be to the principal designer's design and specification (or delegated building designer under the management of the principal designer). If absent or considered not appropriate, the installer shall confirm with the principal designer as to the actions to take.

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 1.2. Such test evidence should be from an appropriate third party audited test facility.

TEST VALIDATION (BOTH SIDES SEPARATELY)		
FIRE RESISTANCE PERFORMANCE TEST	BS476 TEST	EN 13501-2 COMPLIANCE
	30 minutes integrity 15 minutes insulation	30 minutes integrity (E 30) 15 minutes insulation (I 15)

Table 1.2: Cavity barrier test validation with Building Regulation Guidance in England, Approved Document B

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. TGD19 for open state cavity barriers that were not covered by EN1366-4 and is accepted and is being incorporated in prEN 1364-6 [13] that will replace TGD 19.
- 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].



Test compliance with timber and cladding types

The cavity barrier and fire stopping should be tested between the variety of cladding types being specified for a project (or a cladding type that is 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).

It is common practice for the timber-based product in the test to be an engineered timber product such as OSB, plywood, chipboard, LVL, CLT or solid timber. The test report should record the minimum depth of timber required for the cavity barrier performance. For example, cavity barriers in masonry cladding can be tested with masonry outer leaf and solid softwood timber of at least 25mm thickness, which will limit their use to the scale of the masonry and timber thickness used in the test.

Cavity barrier compliance

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 be demonstrated 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 to stop 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 same performance as given in Table 1.1
	<p>DEEMED TO SATISFY BARRIERS UNDER THE ADB 2020 [6]¹ AND TECHNICAL HANDBOOK 2020 [6]¹</p> <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 1.3: Cavity barrier compliance generic compliance under Approved Guidance

NOTES:

¹ Designers shall check the current regulation at the time of design and build as changes may have occurred since the writing of this document.



External wall cavity

Product options for between the structural frame and external cladding

PRODUCT TYPE	HOW THEY WORK	BENEFITS	POINTS TO CONSIDER
MINERAL AND STONE WOOL PLASTIC SLEEVED “SOCKS”⁴	Under compression they provide a tight fit	Ease of site fitting Easily identified Can be changed in dimensions to suit site or design conditions	Butt tight joints - 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 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 filler	Can be factory fitted or site fitted	Butt tight joints - 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 deep Filler to cladding tolerance gaps to be mortar or mineral wool
STEEL PLATES	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 Minimum thickness to design - fire engineered Lapped joints - 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”^{3,4}	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 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 - 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

Table 1.4: 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 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 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.
- ⁴ Tested elements for EI 30/15 (under current guidance but designers should check for updates in guidance since publication of this document). Note that in the Scottish Technical Handbook, cavity barrier means any construction provided to seal a cavity against the penetration of fire and smoke, or to restrict its movement within the cavity. The word ‘seal’ is used without definition, but Scotland Statutory Guidance does allow intumescent barriers.



External wall cavity between the structural frame and external cladding

Soft cavity barrier band	Rigid cavity band	Fire reactive cavity band
MINERAL WOOL SOCKS GOOD IF WITHIN TOLERANCE	TIMBER BATTENS, STEEL PLATES GOOD IF TOLERANCE TAKEN UP BY FILLER	INTUMESCENT BAND GOOD IF DESIGN ACCOUNTS FOR TOLERANCE OF 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	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 1.5: Cavity barrier suitability for external wall cavity conditions

Cavity barriers around openings

Where the opening frame extends beyond the internal fire resistance lining and the reveal passes the cavity zone then the cavity barrier function can be replaced by a fire stopping detail. This ensures that the internal elements of structure maintain the fire resistance required.

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 specifically for that purpose.
3. The char rating of timber cavity barriers or timber elements in the frame can be used to provide fire stopping conditions
4. Drylining, where used as fire resistance barrier/effective fire stopping, may be used to bridge a gap (e.g. window reveal), providing it has support at a free edge, or that a free edge does not cantilever more than the board thickness.
5. Junctions to frames and fire lining/fire stopping element should be sealed with a fire resisting sealant suitable for the fire resistance requirement and gap present.
6. The cavity barrier at the head of the window/door and the reveal must be tightly connected.
7. A window/door frame may be used (if data available) to justify it as a cavity barrier, only if it closes the cavity.



Internal wall cavity

Product options for between the structural frames in compartment walls, ceilings, spandrels and floor zones

PRODUCT TYPE	HOW THEY WORK	BENEFITS	POINTS TO CONSIDER
MINERAL WOOL 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 – 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 – no significant gaps ¹ Minimum size to be cavity width (less tolerance) and 38mm deep ⁵
STEEL PLATES	Plates fitted across the full width of cavity	Site fitted	Minimum 0.5mm thick ² Lapped joints – no significant gaps ¹
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 ⁴	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 – no significant gaps ¹

Table 1.6: Cavity barrier suitability for external wall cavity conditions

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 Tested elements for EI 30/15. Designers are to check current Statutory Guidance for changes in requirements since the publication of this document.
- ⁴ Compartment wall fully filled with mineral (glass or stone) wool creates conditions where no cavity exists and fulfils 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



Internal wall cavity between the structural frame elements

Soft cavity barrier band	Rigid cavity band*	Fire reactive cavity band
MINERAL WOOL SOCKS GOOD IF WITHIN TOLERANCE	TIMBER BATTENS, STEEL PLATES 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 Tight tolerance for factory fit

Table 1.7: Cavity barrier suitability for internal party walls or floor cavity conditions

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

Ensuring competence during installation

The STA, under the STA Assure and timber competency award scheme, recommends an installer training and audit module for its members.

The STA Assure process recommends installer training for cavity barrier and fire stopping installation and a process of signing off, that the as-built barrier has been installed correctly during the works of the STA member; presenting the customer with a technical trail of installation plus the provision of follow-on trade information to reduce errors or mistakes by others during the build process. The follow-on trades will be expected to continue the recommended installation verification as their works may involve interaction with previously installed or the new installation of cavity barriers. Part 5 of this document provides information for follow-on trades.



Tolerance of 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 of follow on trade information to reduce errors or mistakes by others during the build process. In terms of closeness of fit of barriers and fire stopping, there's a need to understand the purpose and sensitivity of the barrier being considered, and as to who is responsible for the final element of installation that completes the assembly. The critical barriers at horizontal floor levels, heads of openings and at gable ceiling level; in these locations as near as perfect installation is essential, with full filled cavity barriers to be under compression (flexi mineral wool) and tight fitted (solid).

The critical barriers at vertical locations are reveals of openings and vertical party wall locations; in these locations as near as perfect installation is essential, with full filled cavity barriers to be under compression (flexi mineral wool) and tight fitted (solid).

Fire stopping is to fully fill the imperfection. In locations such as a compartment wall the use of a flexible mineral wool barrier is commonly adopted as this fire stop between two wall lines for two abutting compartments, such as dwelling party walls. In all cases for fire stopping between compartments the products shall have sufficient depth to provide fire resistance (integrity and insulation) and not allow fire to bypass it via the abutting timber structural elements.

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.



Part 2 - Cavity barrier roles and responsibilities

Responsibility of design

External wall cavity barrier and fire stopping to elements of structure

LOCATIONS	DESIGN RESPONSIBILITY	COMMENT	STRUCTURAL TIMBER BUILDING OPTION TO INSTALL	CHECK AUDIT
DIVISION FOR COMPARTMENTATION	Building designer ¹	The location to be on the builder designer drawings	Areas that allow access to the cavity there is an option to install	By others or option for STA Assure compliance check
CAVITY BARRIER BELOW DPC	Building designer ¹ / sub structure engineer	The location to be on the builder designer drawings	By ground worker or for certain products option to install	By others or option for STA Assure compliance check
CAVITY BARRIER AROUND OPENINGS	Building designer ¹	The location to be on the builder designer drawings	Areas that allow access to the cavity there is an option to install	By others or option for STA Assure compliance check
CAVITY BARRIERS AROUND SERVICE PENETRATIONS	Building designer ¹	The location to be on the builder designer drawings	Areas that allow access to the cavity there is an option to install	By others or option for STA Assure compliance check
FIRE STOPPING	Building designer ¹	The location to be on the builder designer drawings	Areas that allow access to the cavity there is an option to install	By others or option for STA Assure compliance check

NOTES:

- ¹ Building designer is the architect or principal designer, not the structural timber frame designer. The structural timber frame designer is typically contracted to provide the structural frame only and not fire performance. See STA Technical Note 31 - vocabulary of roles in a structural timber building project [2].



Internal frame elements

Cavity barriers to internal compartment walls and floors and fire stopping to elements of structure

LOCATIONS	DESIGN RESPONSIBILITY	COMMENT	STRUCTURAL TIMBER BUILDING PROVIDER INPUT	CHECK AUDIT
DIVISION FOR COMPARTMENTATION	Building designer ¹	The location to be on the builder designer drawings	Areas closed off by the build process installed by provider as work progresses	STA Assure compliance check
			In areas follow on trades can access there is an option to install	By others or option for STA Assure compliance check
CAVITY BARRIER AROUND OPENINGS	Building designer ¹	The location to be on the builder designer drawings	In areas follow on trades can access there is an option to install	By others or option for STA Assure compliance check
CAVITY BARRIERS AROUND SERVICE PENETRATIONS	Building designer ¹	The location to be on the builder designer drawings	Typically works occur after structural timber provider has left site	By others
FLOOR ZONE ABOVE COMPARTMENT OR LOAD BEARING WALLS	Building designer ¹	The location to be on the builder designer drawings	In areas follow on trades can access there is an option to install	By others or option for STA Assure compliance check
FIRE STOPPING	Building designer ¹	The location to be on the builder designer drawings	In areas follow on trades can access there is an option to install	By others or option for STA Assure compliance check

NOTES:

- ¹ Building designer is the architect or principal designer, not the structural timber frame designer. The structural timber frame designer is typically contracted to provide the structural frame only and not fire performance. See STA Technical Note 31 - vocabulary of roles in a structural timber building project [2].



Responsibility

Installation responsibility

The STA recommendations for installer training and audit process should be followed. The STA process includes as-built labels and care point checks on work, so that it can be traced back to the company responsible; see Part 5 of this document.

Resilience

The performance of a product can be severely undermined by poor installation, leading in the event of a fire to consequential spread of the fire. Any significant gaps in a line of a cavity barrier (that is not an intumescent based product, or other product justified by test), is not acceptable as such gaps can lead to a breach in the cavity barrier function.

The presence of significant gaps in any building installation cannot be practicably guaranteed without exacting quality control processes at each trade interface; therefore to provide increased resiliency to the construction process the building designer, under a risk mitigation approach, may follow the more robust cavity barrier installation process presented by Scotland Statutory Guidance.

The STA presents in Part 3 the locations STA recommend for resilience, but also notes on what the common approach is to achieve minimum Statutory Regulation guidance. In undertaking a higher level of installation, is not to suggest a relaxation on the tight quality controls being demanded of the STA installers with no significant gaps being present in the as-built cavity barriers or fire stopping.

For installation see

Part 4 - good practice concept details

Part 5 - care points

Product substitution

Product substitution from that specified may alter the fire resistance performance significantly and cannot be done unless approved by the company responsible for the product specification and the building designer.



■ Part 3 - Cavity barrier locations

Background to locations and details

The functional requirements and regulation guidance requirements for cavity barriers is presented in Part 1 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.

Cavity barrier locations

Sub-divide extensive cavities

STA consider that for combustible cavities subdivision shall be 10m in multi occupancy dwellings and 20m for Euro class A1/A2/B sheathing exposed to the cavity and where the breather membrane does not contribute to the fire. The STA recommend the approach taken by the Scottish Technical handbook 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 20 - 25

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



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

**D = Good practice concept detail
in part 4 of this document**

e.g. D12 = DETAIL 12



STA good practice guide to cavity barrier locations

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

Locations for resilience; single dwellings

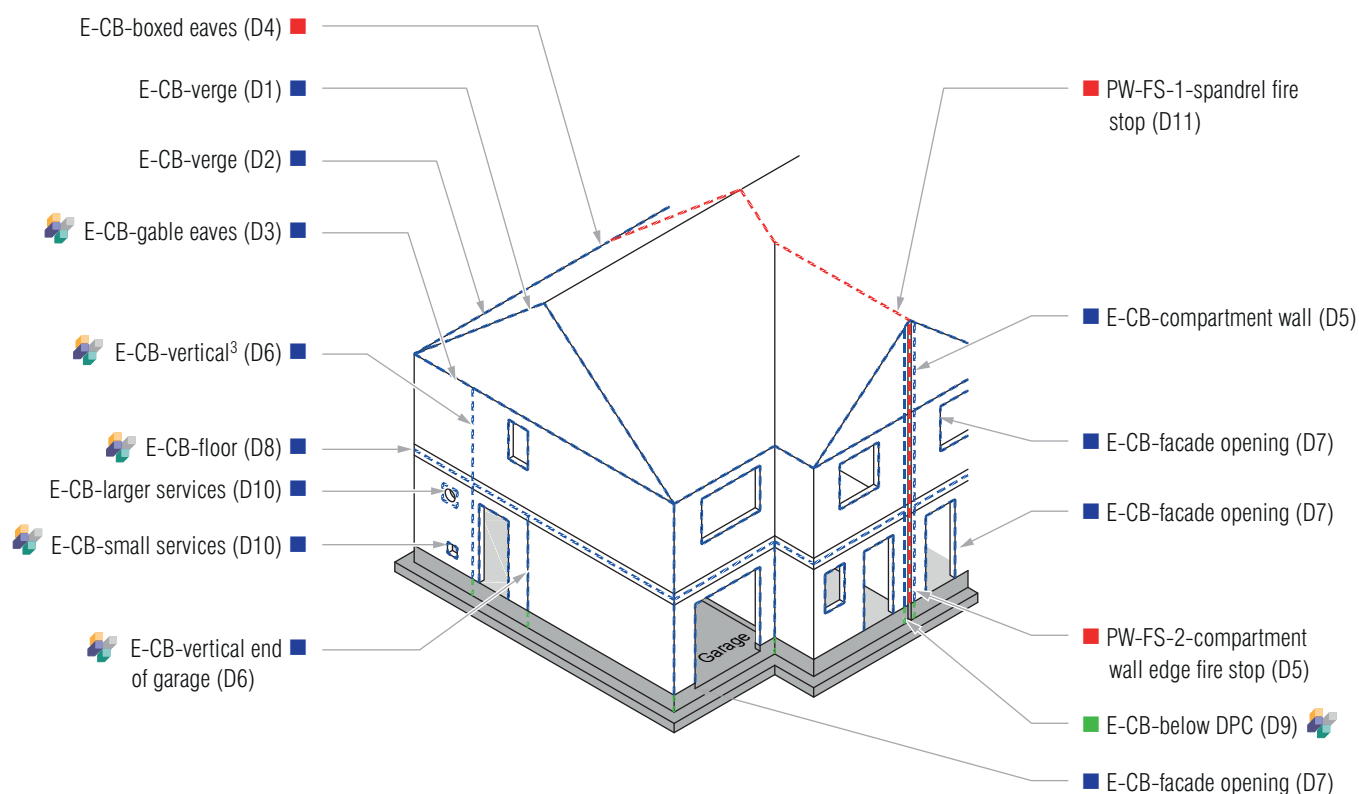


Figure 3.1: External weather facade to structural timber frame¹ cavity barrier locations⁴; single dwelling structure with uninhabited pitch roof space²

NOTES:

- ¹ 'Facade' covers all forms from masonry, masonry slip elements, render boards, lightweight cladding boards and timber cladding. However some cladding 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, 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 STA logo) these are common and standard solutions in Scotland and Northern Ireland.



Locations for resilience; single dwellings cont.../

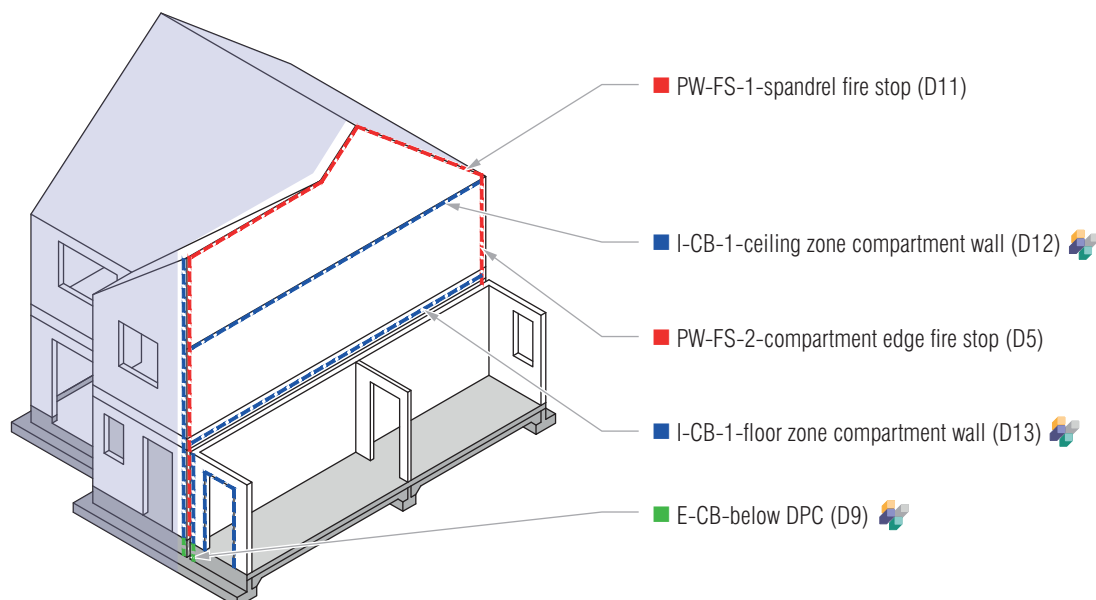


Figure 3.2: Internal frame compartment wall between dwellings that includes a cavity; single dwelling structure with uninhabited pitch roof space²

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.



Full filled party walls result in the cavity barrier being installed by default of the mineral wool fill. However, the top of party wall may require a specific cavity barrier if edge seal uninsulated or single spandrel panels are used.



Locations for resilience; multi-occupancy

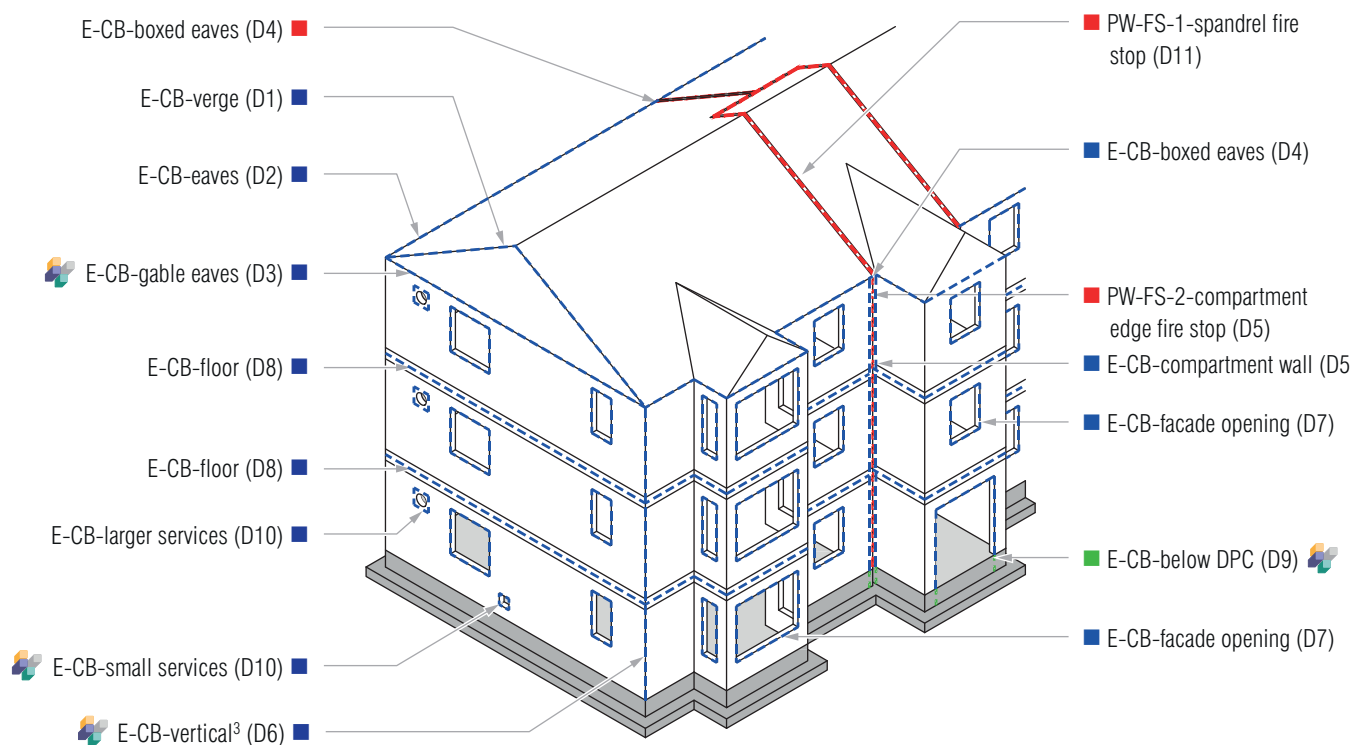


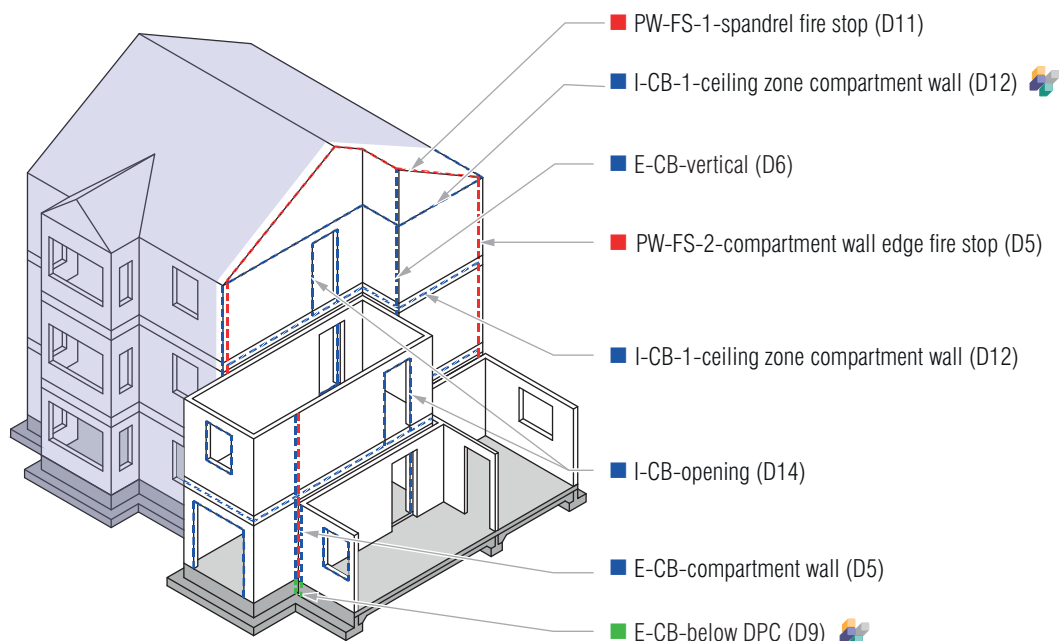
Figure 3.3: External weather facade to structural timber frame cavity barrier locations^{2,4}: resilience solution for multi-occupancy dwelling.

NOTES:

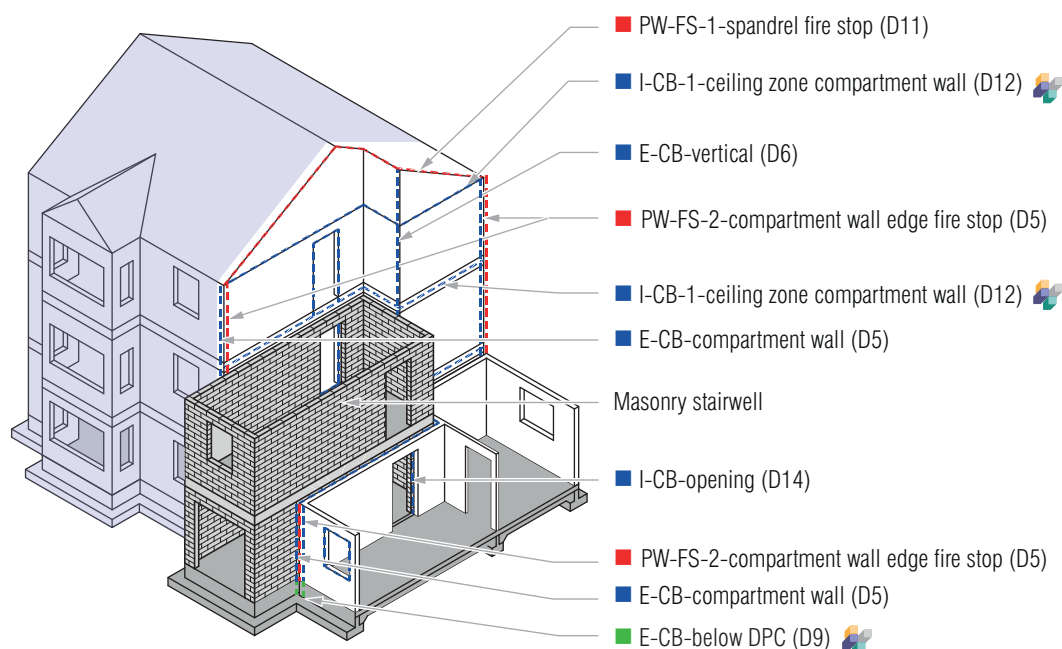
- ¹ 'Facade' covers all forms from masonry, masonry slip elements, render boards, lightweight cladding boards and timber cladding. However some cladding types such as open facade cladding, steel plates and open board designs may require additional cavity barriers, subject to the designer's answer to 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, 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 multi-colored icon) these are common and standard solutions in Scotland, Northern Ireland, Wales and England.



Locations for resilience; multi-occupancy cont.../



a. Full structural timber



b. Structural timber with concrete/masonry common areas

Figure 3.4: Internal frame compartment wall between dwellings and common areas that include a cavity



Full filled party walls result in the cavity barrier being installed by default of the mineral wool fill. However, the top of party wall may require a specific cavity barrier if edge seal uninsulated or single spandrel panels are used.



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

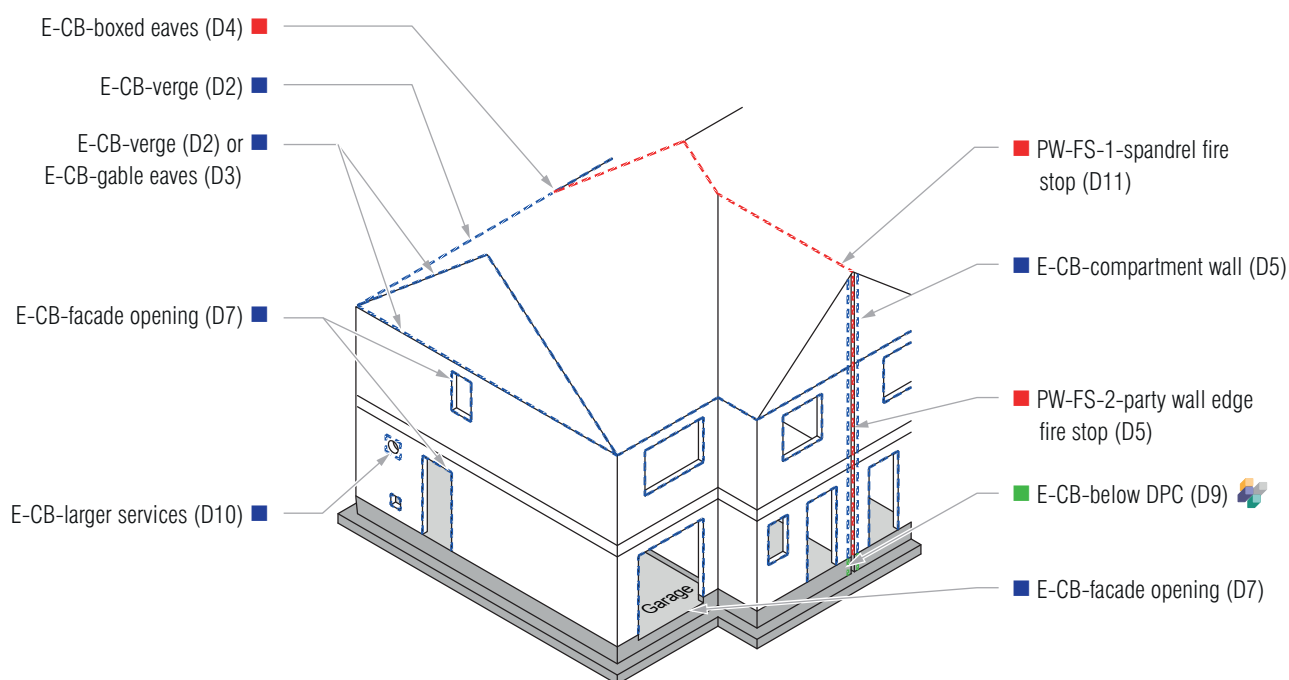



Figure 3.5: External weather facade to structural timber frame¹ e cavity barrier locations²; single dwelling England and Wales guidance⁵ compliance

NOTES:

- ¹ 'Facade' 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.
- ⁵ Minimum level of cavity barrier installation commonly adopted to comply (except for those marked ) with current building regulation Statutory Guidance in England and Wales as of June 2021. Checks must be made to determine if updates are in place for Wales and England since the publication of this document.



Locations for minimum compliance in England and Wales; single dwelling cont.../

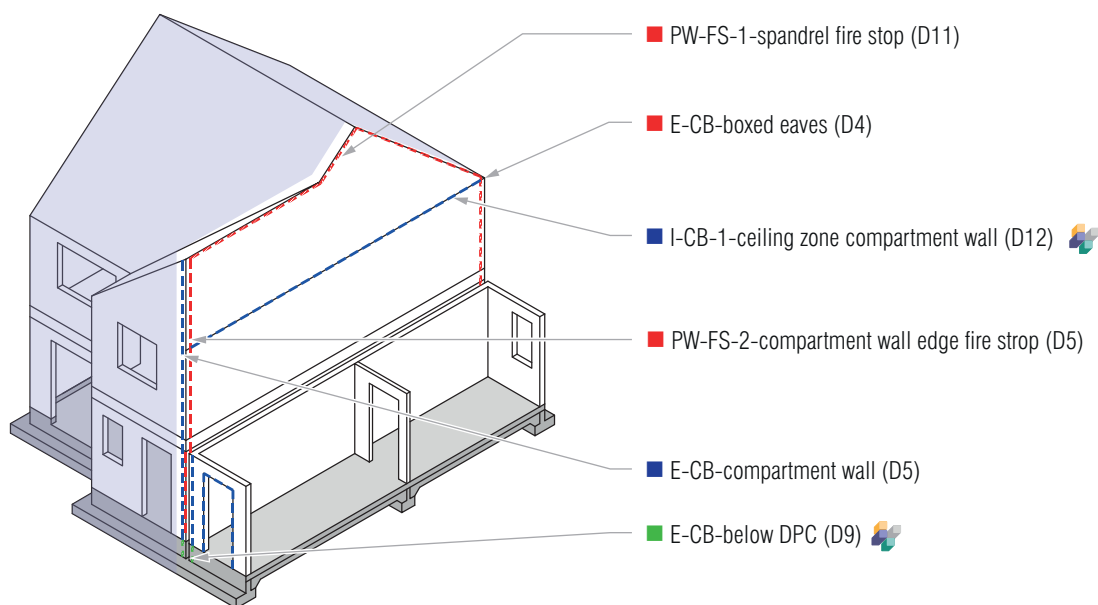



Figure 3.6: Internal frame compartment wall between dwellings that include a cavity; single dwelling England and Wales compliance only

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 ) with current building regulation Statutory Guidance in England and Wales as of June 2021. Checks must be made to determine if updates are in place for Wales and England since the publication of this document.

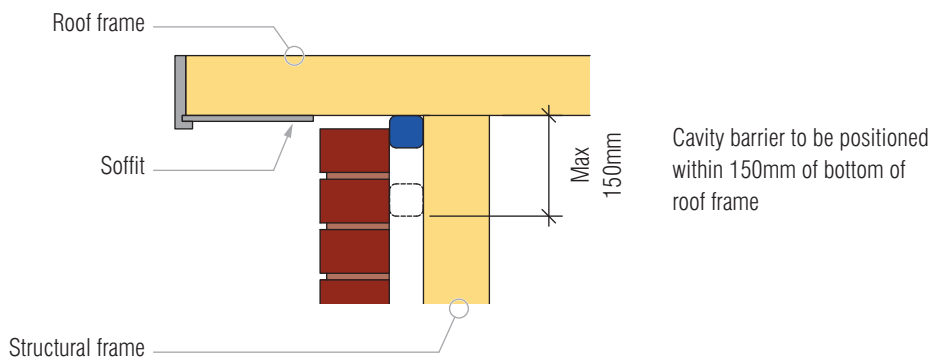


Full filled party walls result in the cavity barrier being installed by default of the mineral wool fill. However, the top of party wall may require a specific cavity barrier if edge seal uninsulated or single spandrel panels are used.



Part 4 - Good practice concept details

D1: E-CB-verge



D1: Section through verge

DETAIL NOTES:

Drylining and insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

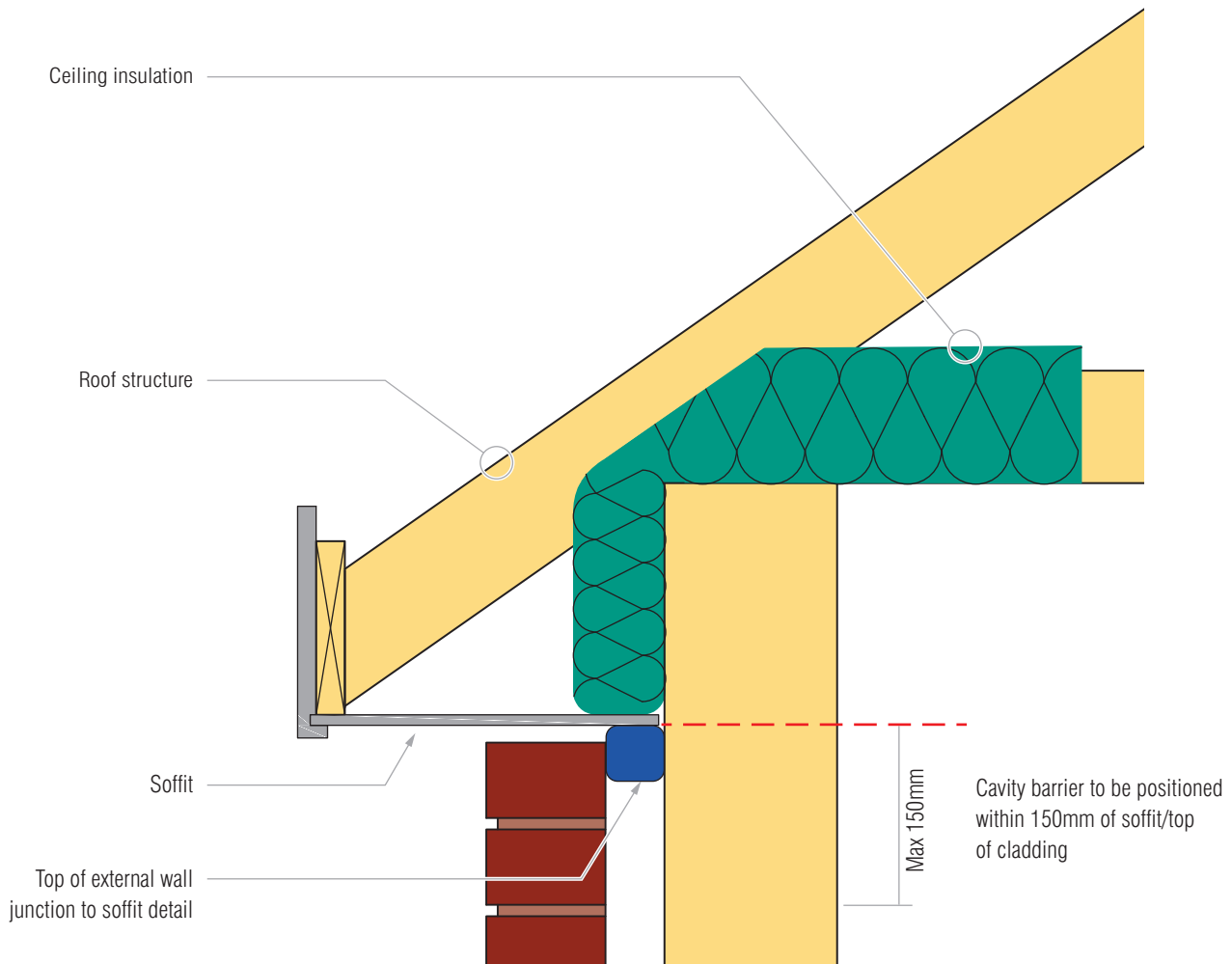
Movement joint at interface of masonry cladding and soffit, note this may need to be fire stopped (fire mastic) at a boundary condition

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



D2i: Section through verge at eaves

DETAIL NOTES:

Cold/warm/flat roof structures

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

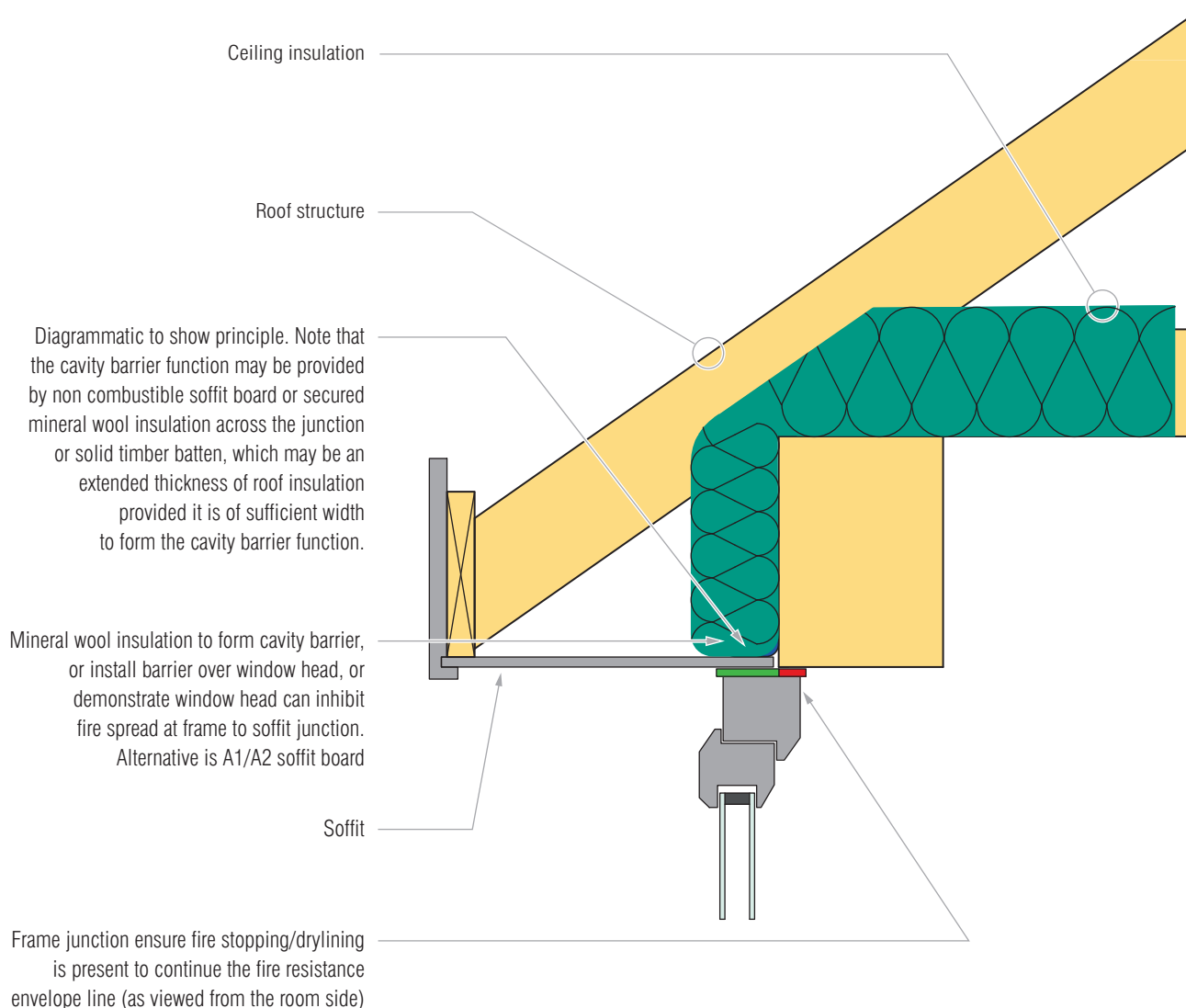
At above window locations the design of the building may require the soffit board to have a fire resistant function (typically for multi-storey care homes). This may also provide the function of cavity barrier subject to the cladding detail

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 cont.../



D2ii: Section through verge if window is at eaves level

DETAIL NOTES:

Cold/warm/flat roof structures

Drylining and wall insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

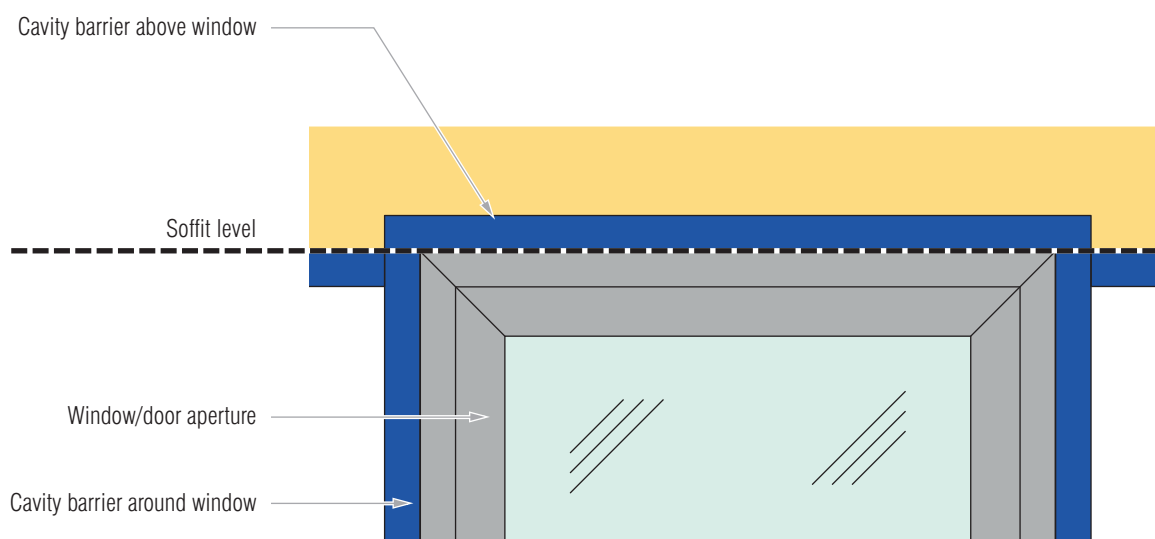
Movement joint at interface of masonry cladding and soffit, note this may need to be fire stopped (fire mastic) at a boundary condition

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

DETAIL INTENTION:

To continue the cavity barrier that is abutting the window reveal at the top of the cavity in the external wall (see D2iii).



ELEVATION

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

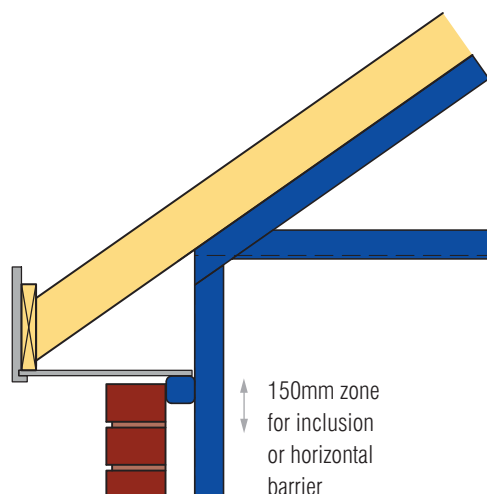
DETAIL INTENTION:

To continue the cavity barrier that is abutting the window reveal at the top of the cavity in the external wall (see D2ii).



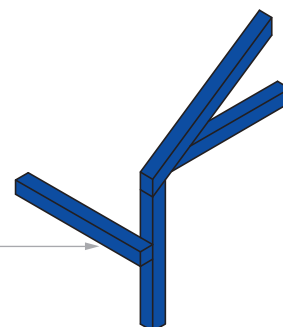
D3: E-CB-gable eaves

RESILIENT SOLUTION



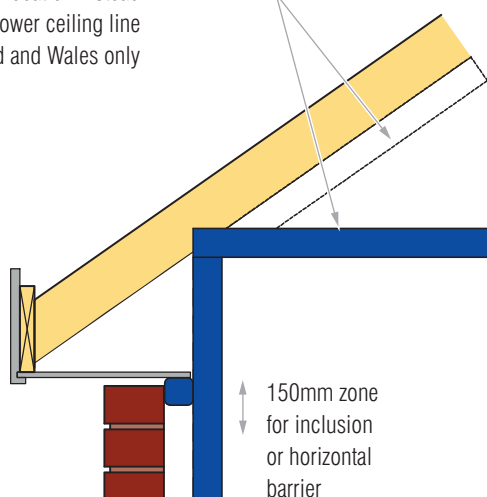
Gable wall cavity
elevation view

See E-CB-eaves (D2)



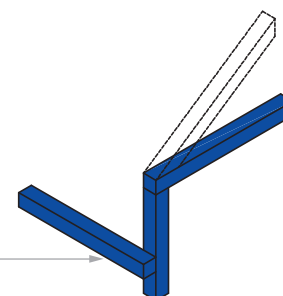
COMPLIANCE FOR ENGLAND & WALES

Alternative location instead
of lower ceiling line
England and Wales only



Gable wall cavity
elevation view

See E-CB-eaves (D2)



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

DETAIL NOTES:

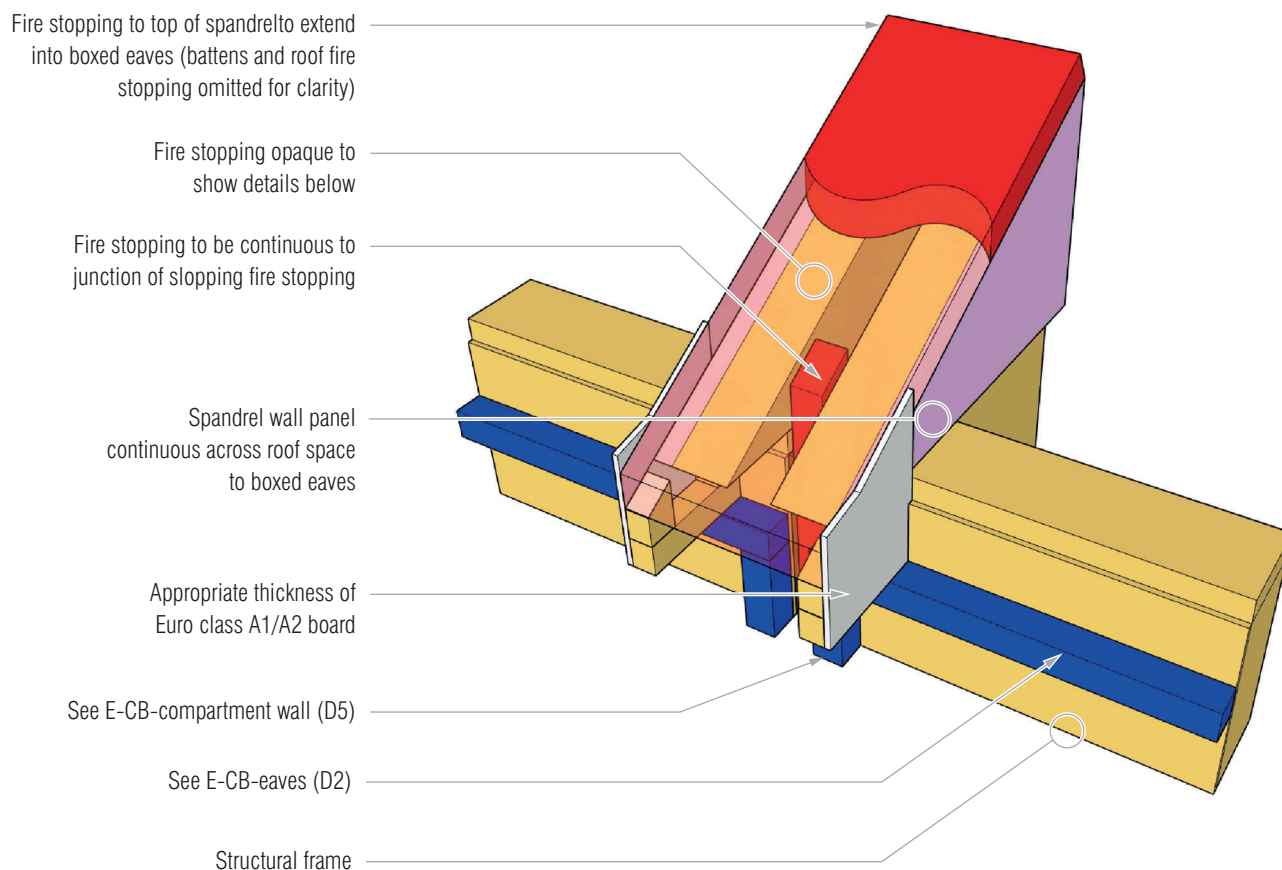
All junctions to be butting

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

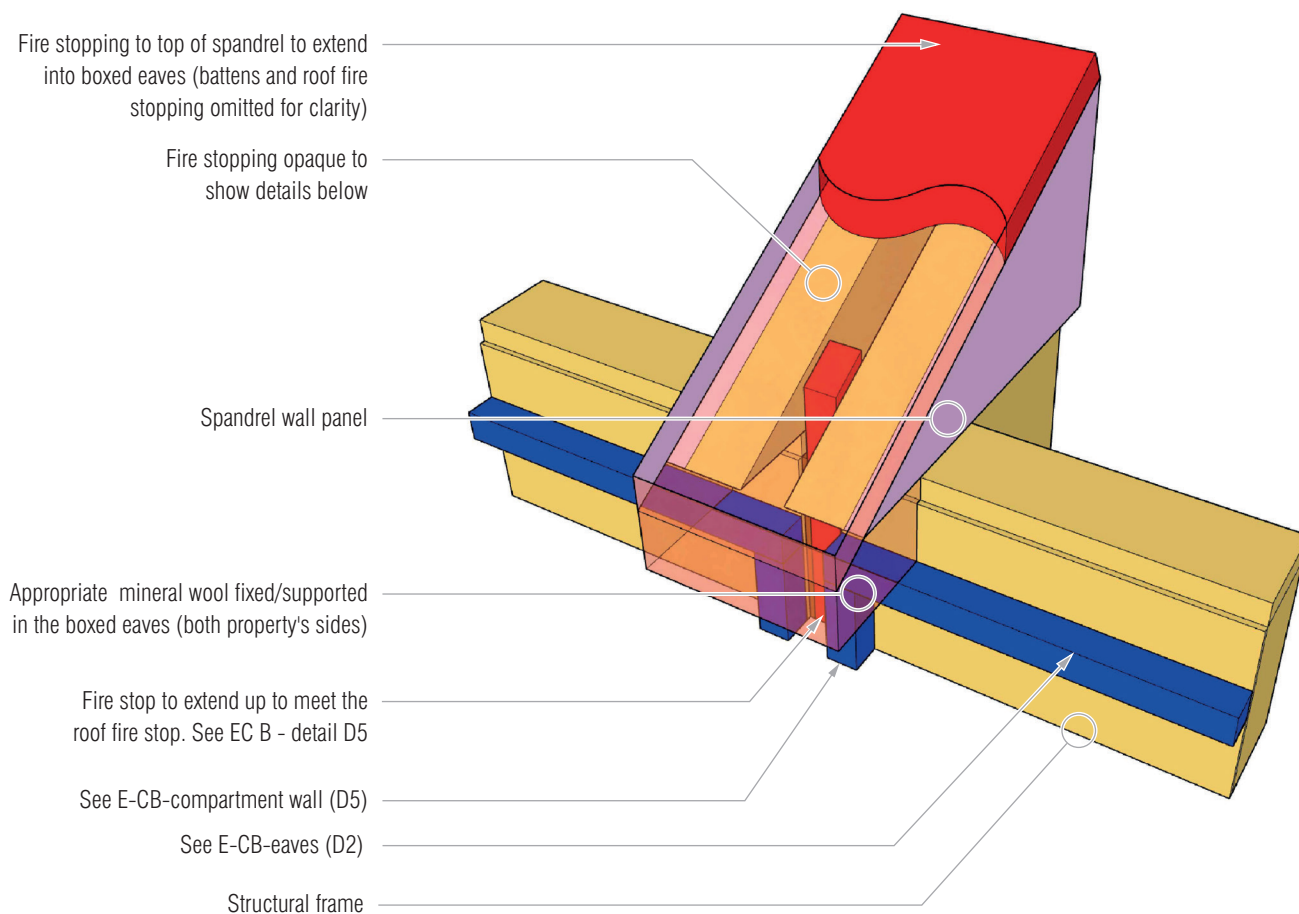
At above window locations the design of the building may require the soffit board to have a fire resistant function (typically for multi-storey care homes). This may also provide the function of cavity barrier subject to the cladding detail

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.../



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

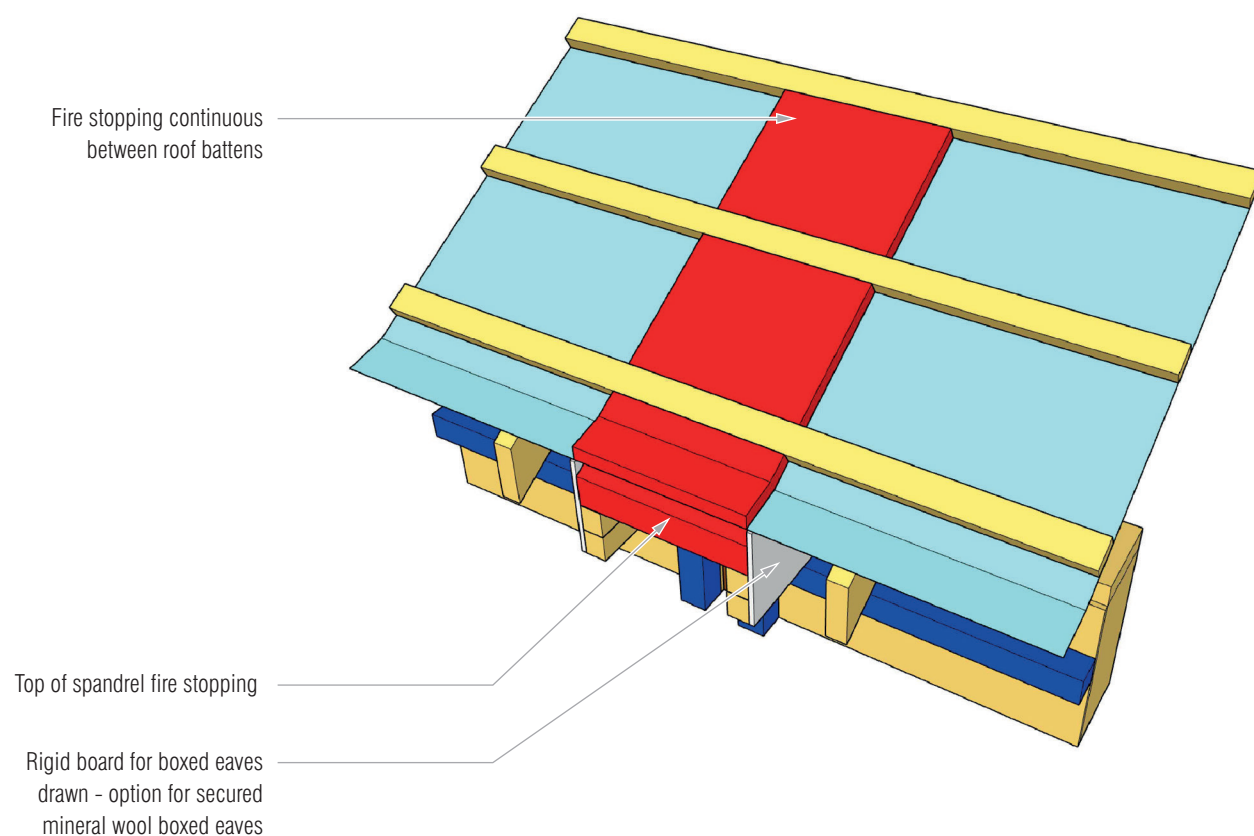
Intumescent products to be tested for this application

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

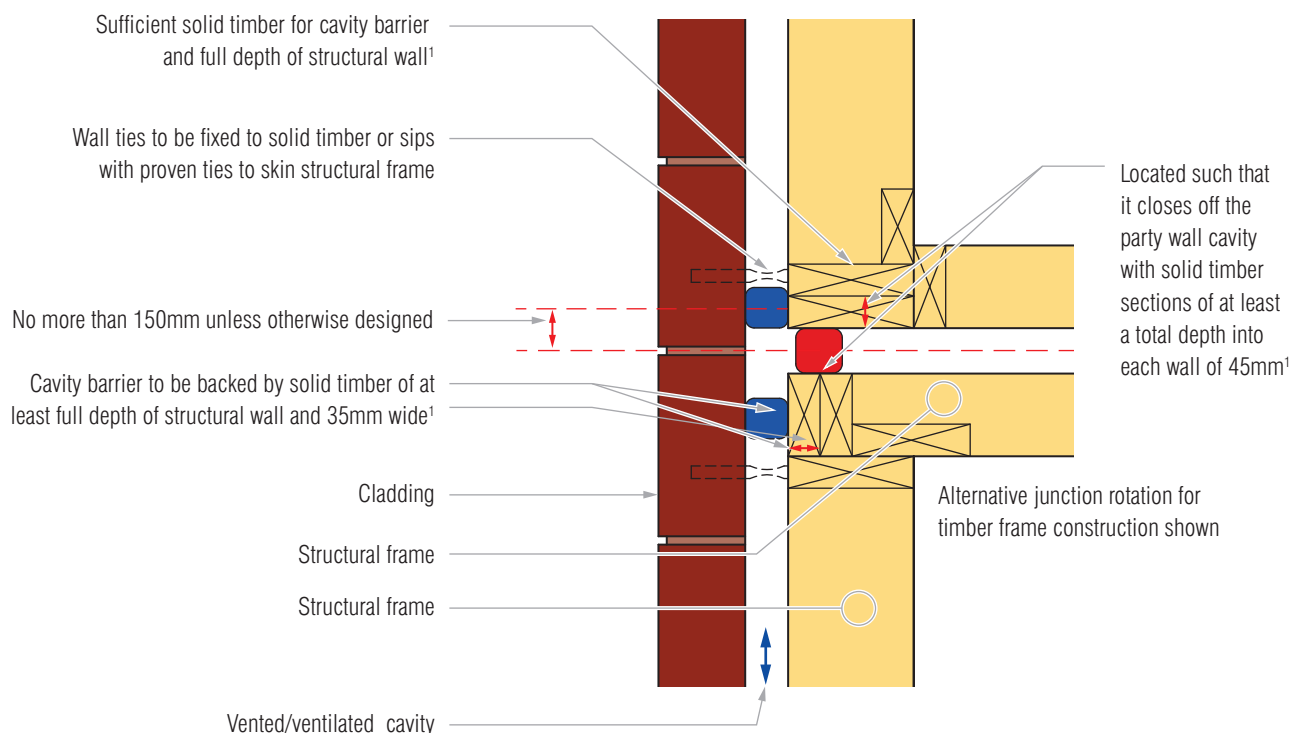
Soffit board omitted for clarity

Intumescent products to be tested for this application

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



NOTES:

- ¹ Full depth 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 wider timber support.

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

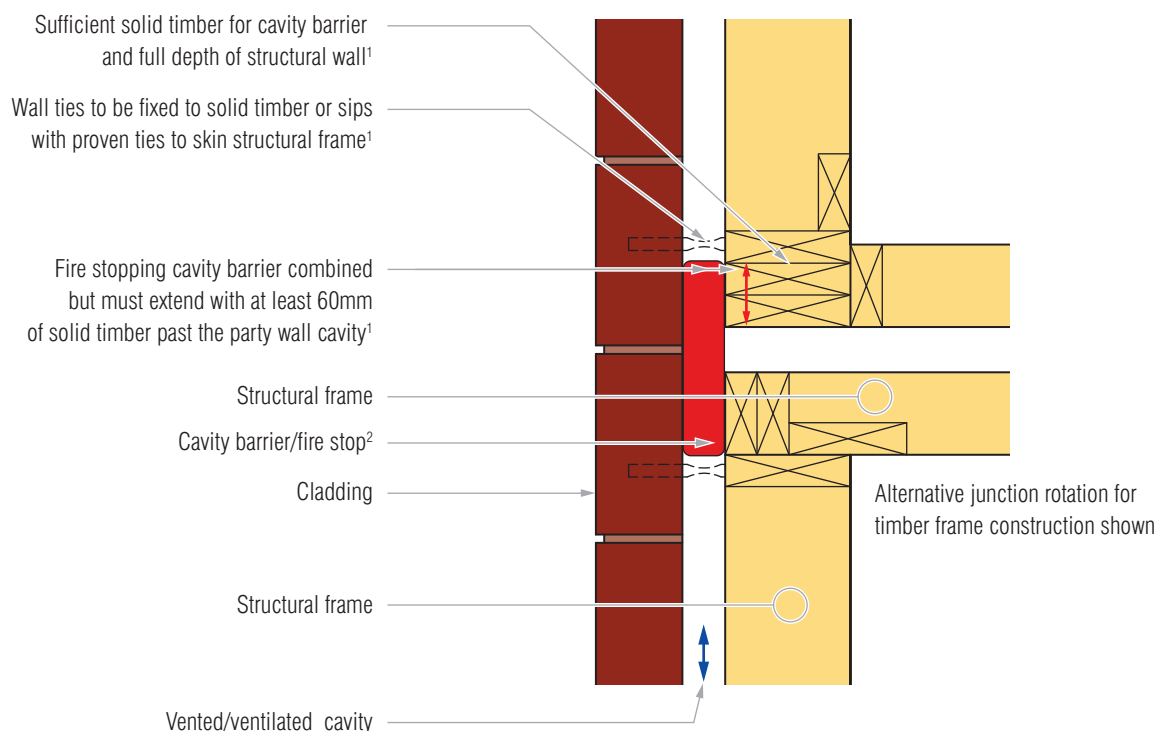
Intumescent barrier option subject to manufacturer test compliance for cavity width present

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.../



NOTES:

- ¹ Full depth 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 wider timber support.
- ² Cavity barrier is acting as a fire stop and shall be suitable product for this application (test certificate)

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

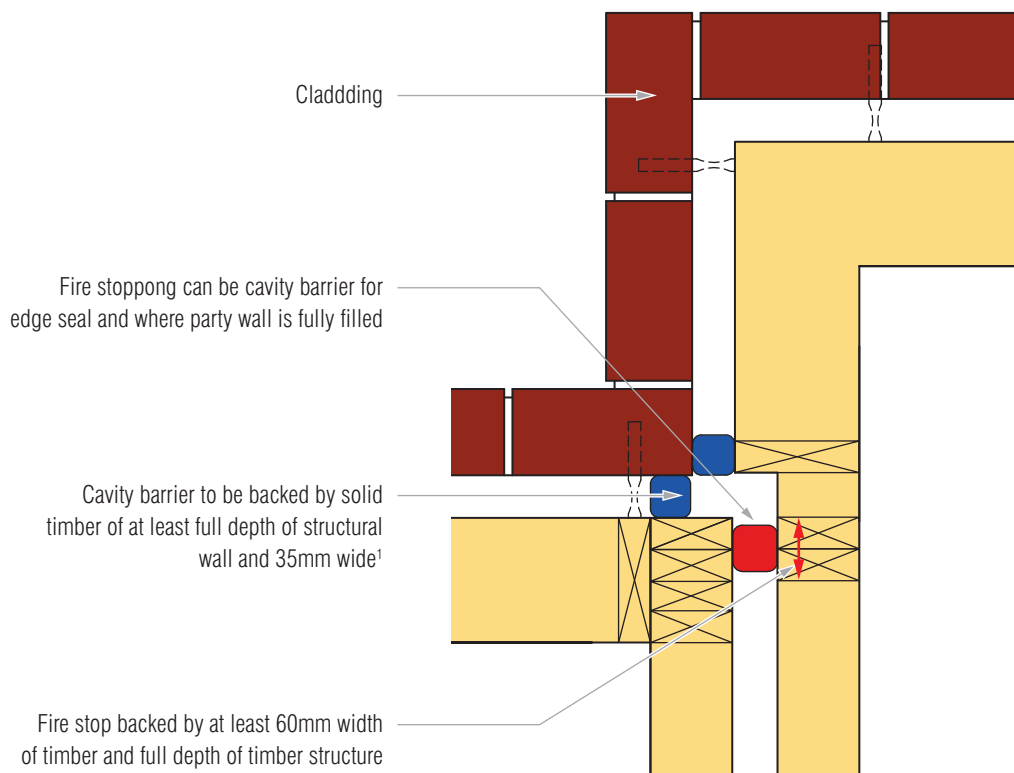
Wall ties/battens to cladding to be fixed back to solid timber elements of at least 38mm deep, plus allow space for ties

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.../



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 wider timber support.

D5iii: Plan view of staggered compartment wall

DETAIL NOTES:

Drylining omitted for clarity

Insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

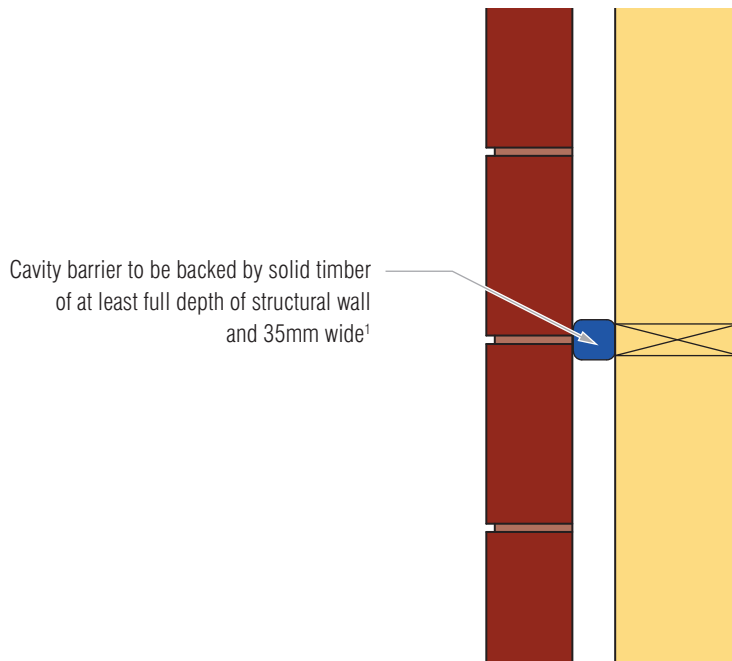
Intumescent barrier option subject to manufacturer test compliance for cavity width present

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



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 wider timber support.

D6: Plan view of vertical cavity barrier

DETAIL NOTES:

Drylining and insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

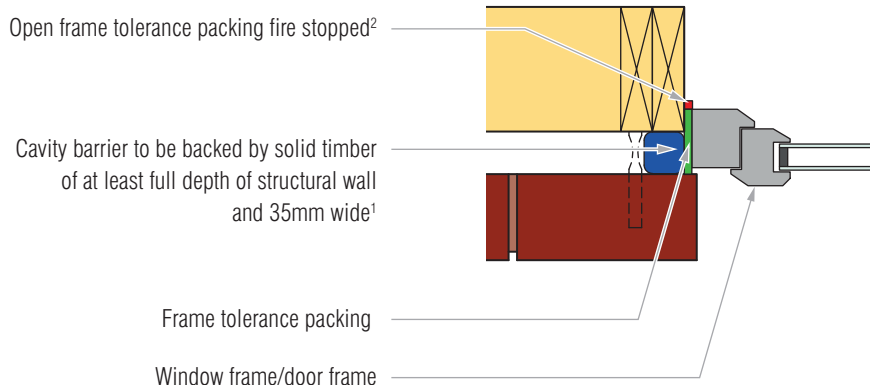
Material types - intumescent options acceptable

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-façade opening



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 wider timber support.

NOTES:

² Fire stopping function may be from abutting drylining to timber frame

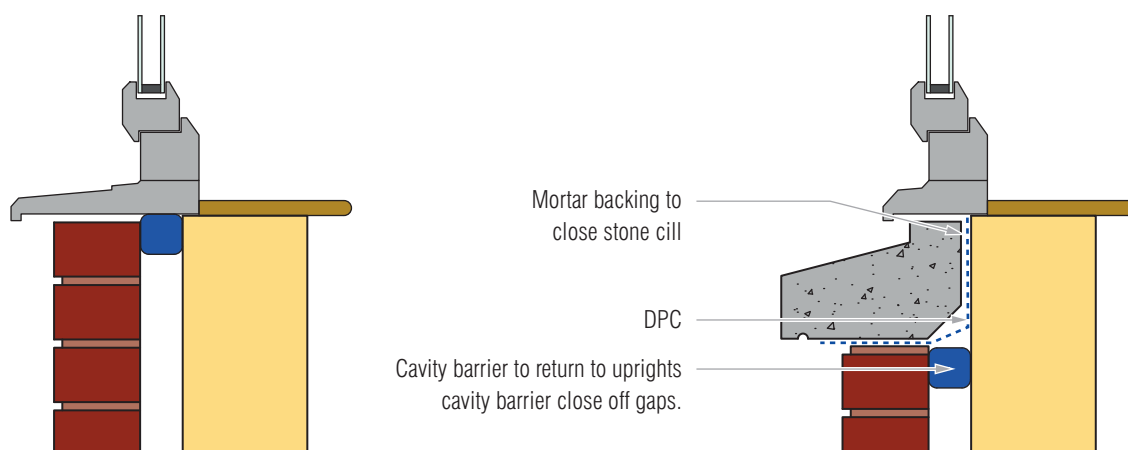
D7i: Plan view of window reveal

DETAIL NOTES:

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

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.



D7ii: Section of cill

DETAIL NOTES:

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

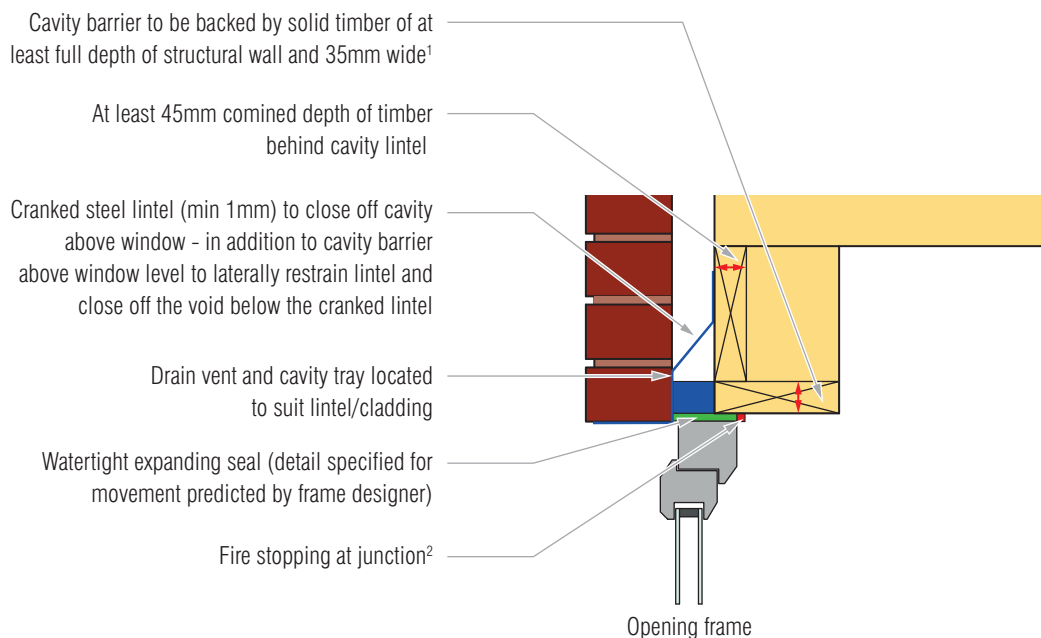
Where a specifically designed stone cill closes off the cavity, it can provide the function of the cavity barrier

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-façade opening cont.../



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 wider 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 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

Drylining and insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

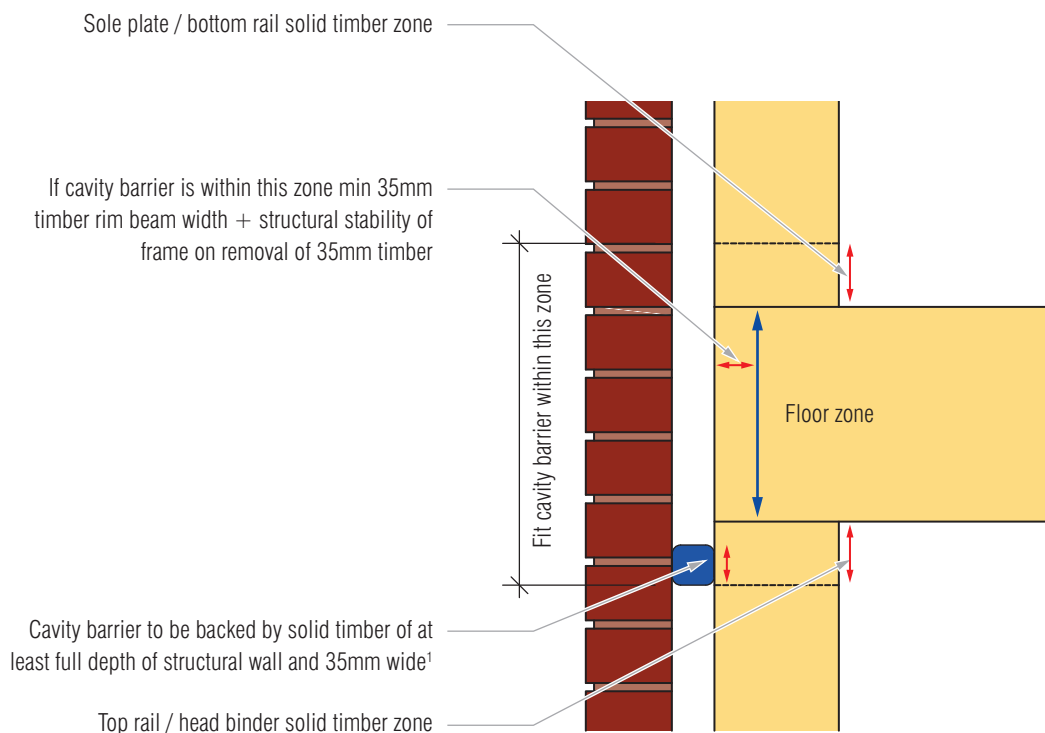
Material types; intumescent options acceptable

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.



D8: E-CB-floor



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 wider 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

Floating floors for compartment floor omitted for clarity

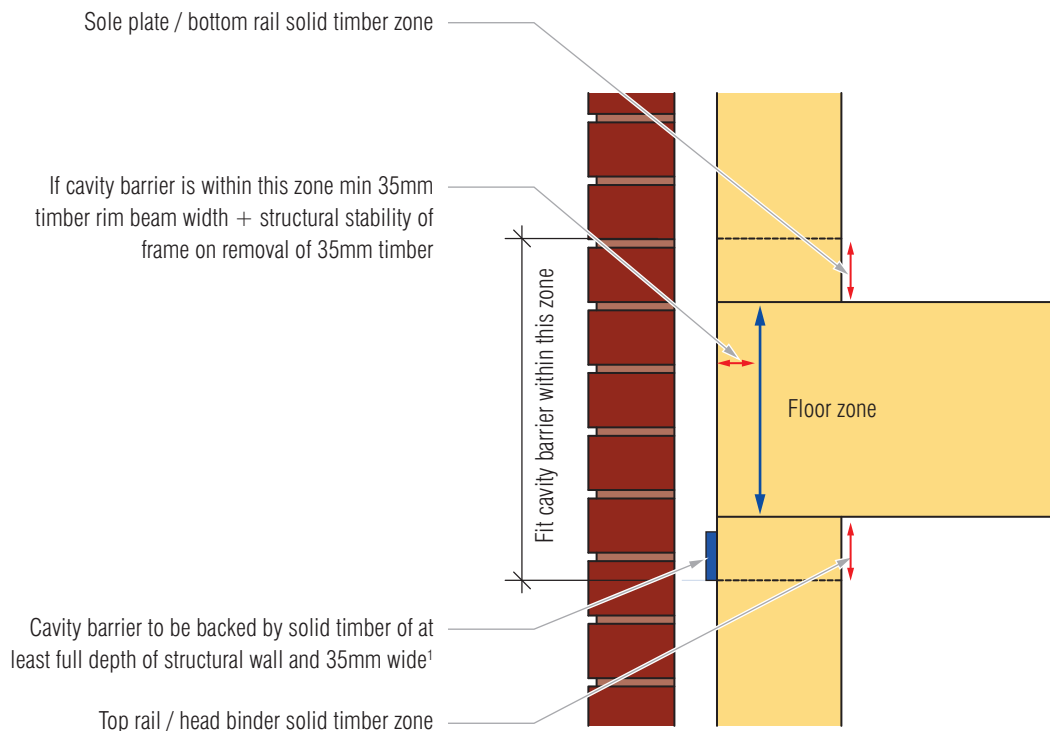
Cavity barrier and vents not needed with intumescent barrier

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.../



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 wider 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

Floating floors for compartment floor omitted for clarity

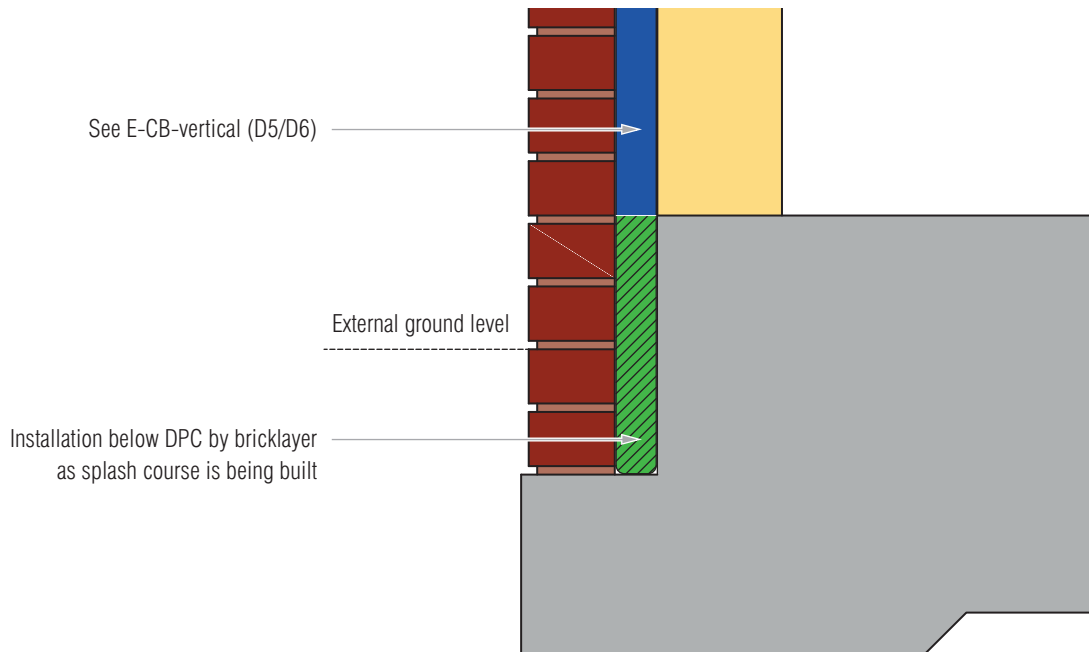
Cavity barrier and vents not needed with intumescent barrier

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.



D9: E-CB-below DPC



D9: Section below DPC

DETAIL NOTES:

DPC omitted for clarity

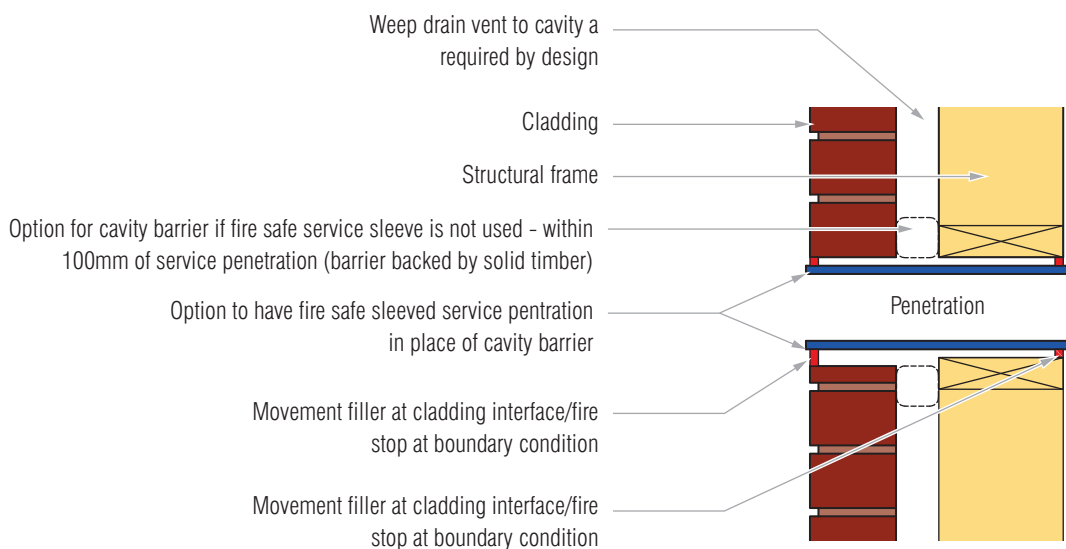
Cavity barrier below DPC can be mineral wool or masonry with appropriate DPC detailing

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



D10i: Section around service penetration

DETAIL NOTES:

Drylining and insulation omitted for clarity

Wall ties, breather membrane and VCL omitted for clarity

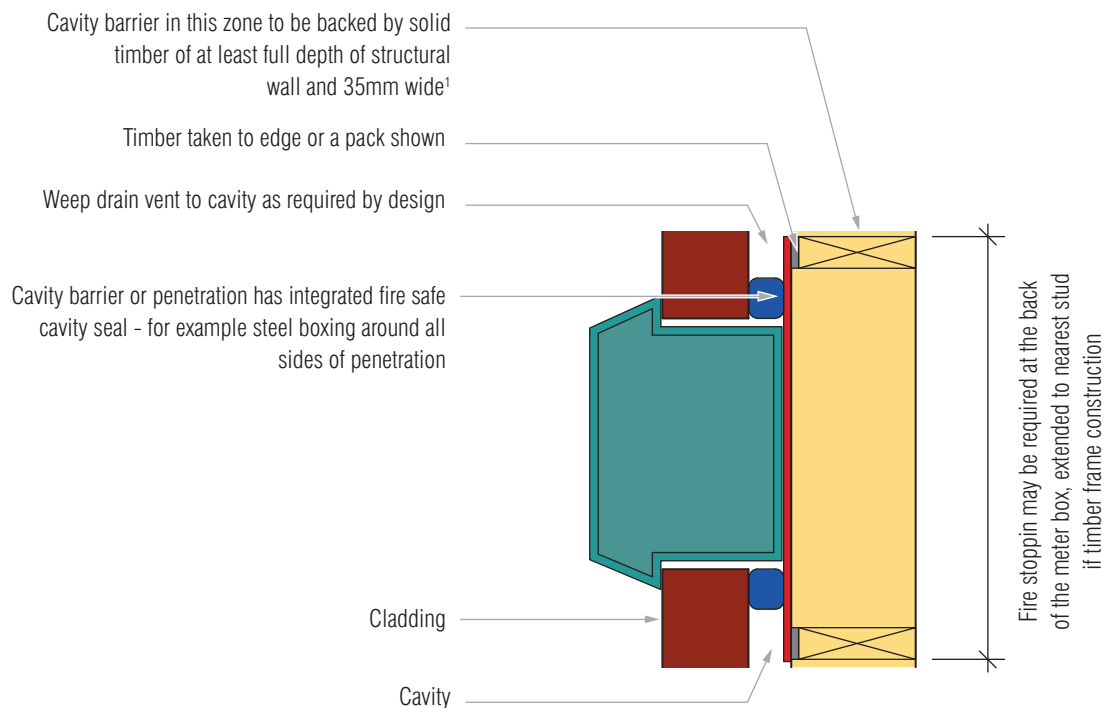
Intumescent barrier option subject to manufacturer test compliance for cavity width present

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.../



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 wider timber support.

D10ii: Plan view of meter box

DETAIL NOTES:

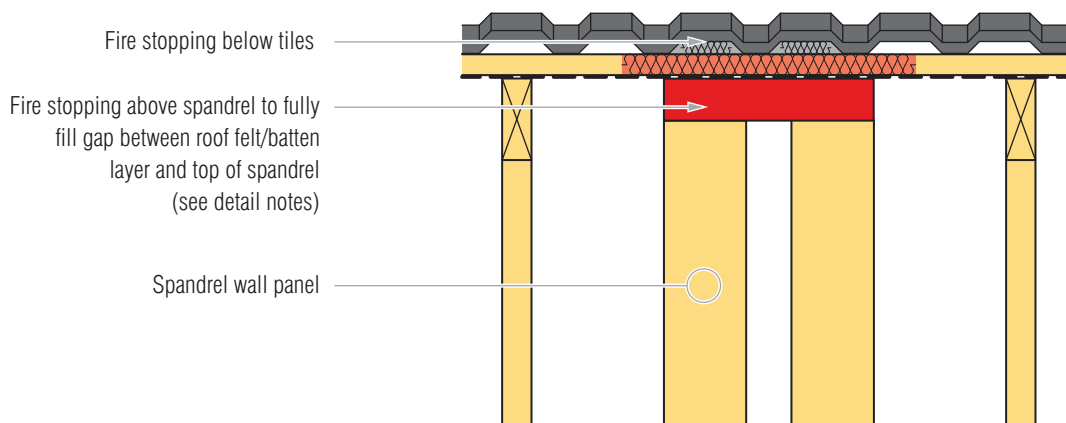
Movement filler at cladding interface/firestop at boundary condition

DETAIL INTENTION:

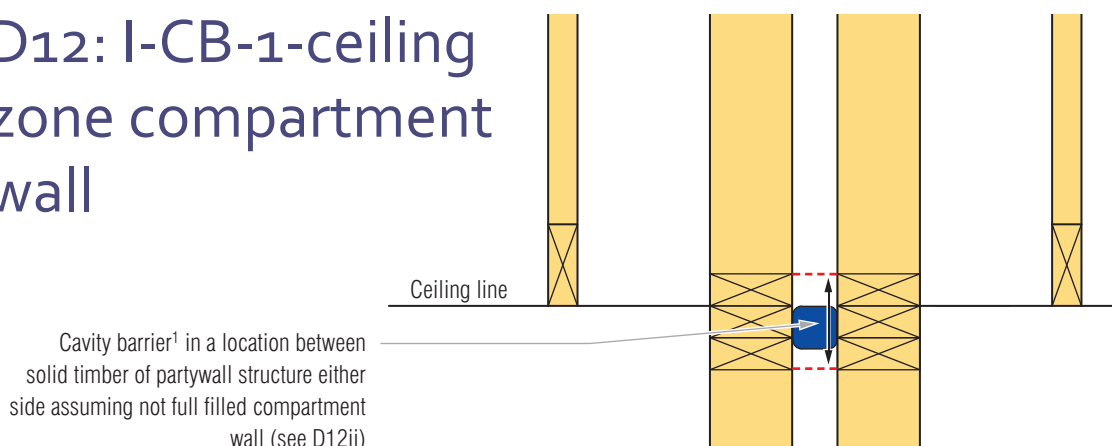
To close off the edge of a cavity caused by the service penetration. In addition to ensure that the envelope of the fire resistance assembly is maintained by fire stopping junctions at the surface of the service penetration.



D11: PW-FS-1-spandrel fire stop



D12: I-CB-1-ceiling zone compartment wall



NOTES:

- ¹ Fire stopping needed when single leaf spandrels adopted
- ² Full width of cavity barrier timbers or other demonstration that the cavity barrier function is not by passed by fire passing within the attached structural wall element

D11 and D12i: Section of spandrel fire stop and ceiling zone compartment wall (option 1)

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

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, but top of spandrel must be provided

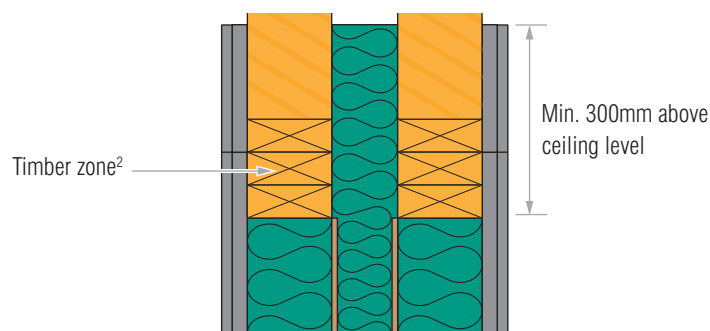
DETAIL INTENTION:

D11 - 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 - to close off a compartment wall cavity when fully filled mineral wool insulation is not present (see D12ii).



D12: I-CB-1-ceiling zone compartment wall cont.../



Option to fire stopping at this junction

NOTES:

- ² Full width of cavity barrier timbers or other demonstration that the cavity barrier function is not by passed by fire passing within the attached structural wall element

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

DETAIL NOTES:

Cold or warm roof condition

Insulation and drylining shown as indicative this is to be to the project design

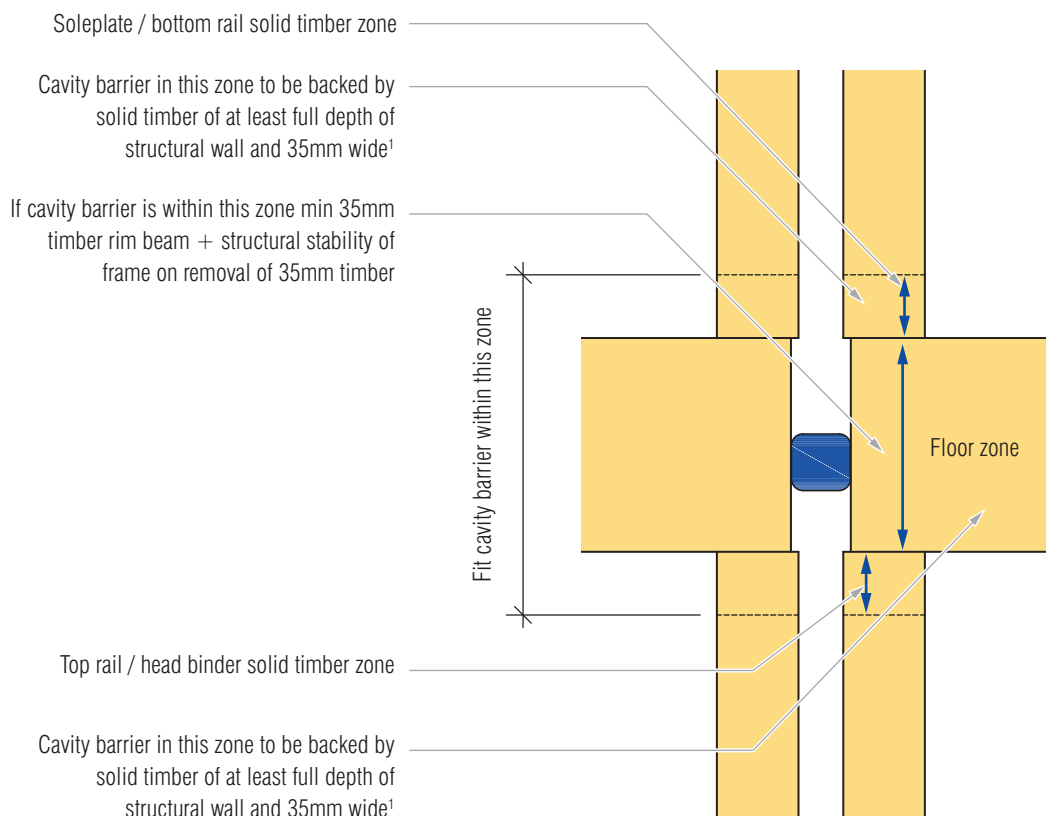
Intumescent products may be suitable subject to manufacturer's declaration of test and suitability of gap width

DETAIL INTENTION:

To close off a compartment wall cavity.



D13: I-CB-floor zone



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 wider timber support.

D13i: Section of floor zone cavity barrier

DETAIL NOTES:

Drylining and insulation omitted for clarity

Ties and VCL omitted for clarity

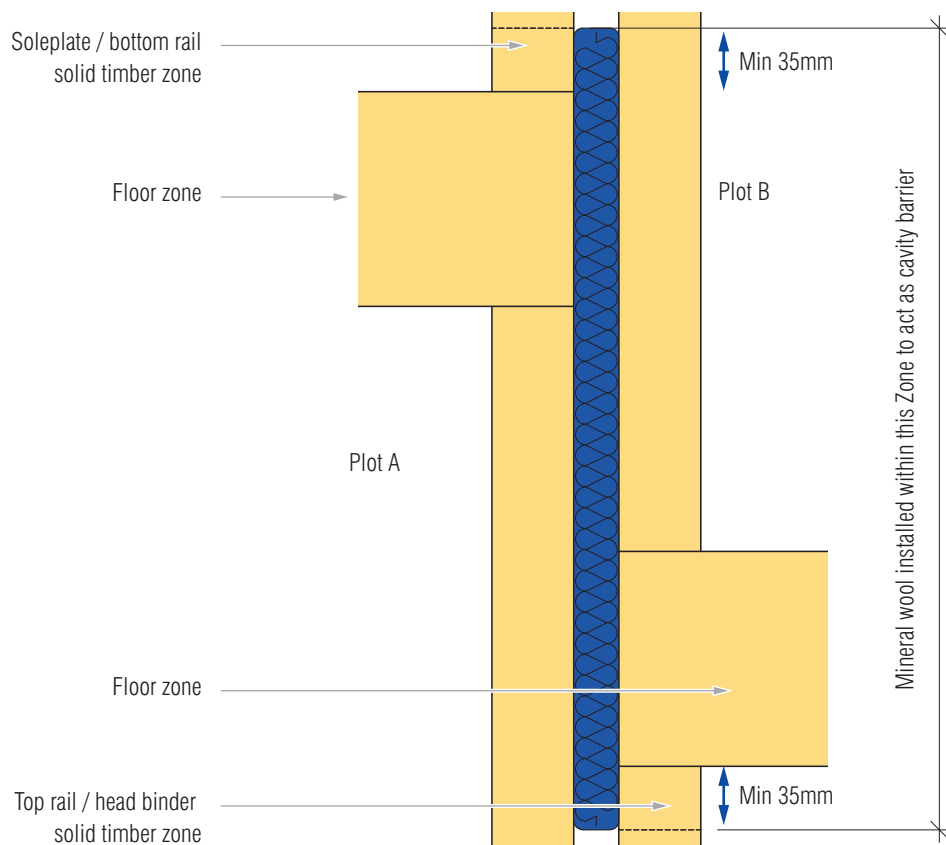
Intumescent barrier option subject to manufacturer test compliance for cavity width present

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.../



D13ii: Section of stepped floor zone cavity barrier

DETAIL NOTES:

Drylining and insulation omitted for clarity

Ties and VCL omitted for clarity

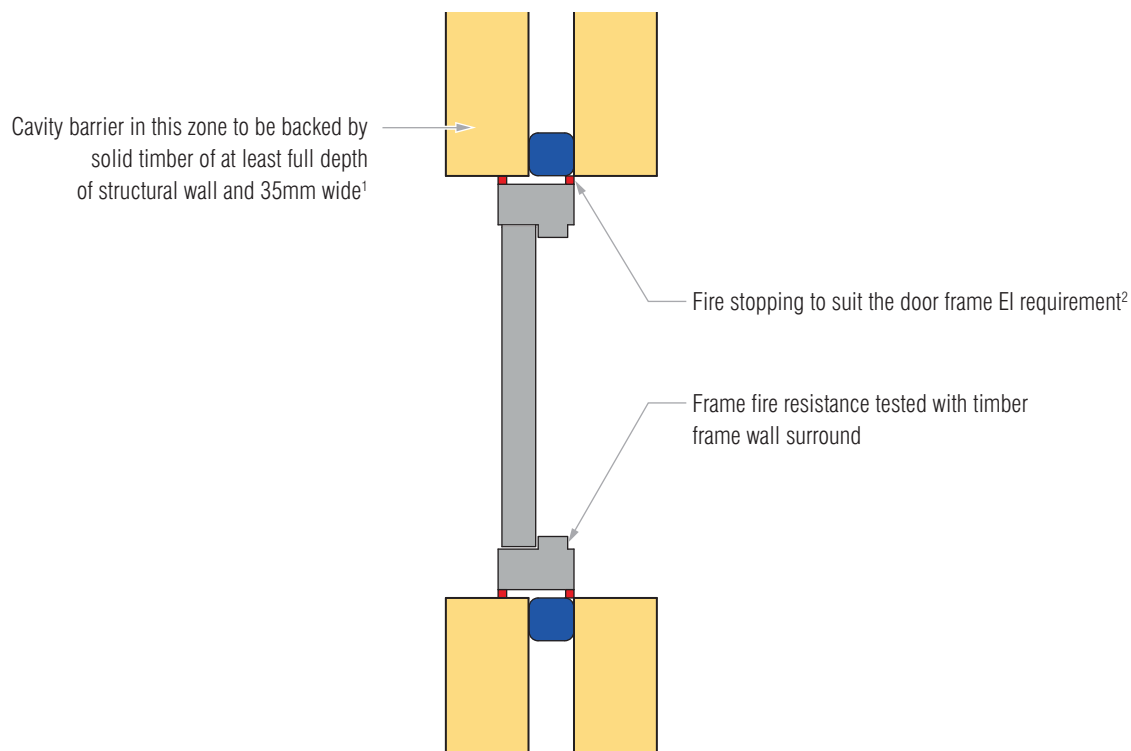
Intumescent barrier option subject to manufacturer test compliance for cavity width present

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.



D14: I-CB-opening



NOTES:

- ¹ Full width of cavity barrier timbers or other demonstration that the cavity barrier function is not by passed by fire passing within the attached structural wall element
- ² Fire stopping function may be from abutting drylining to timber frame

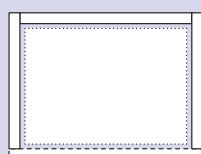
D14: Plan view of party wall opening

DETAIL NOTES:

Drylining omitted for clarity cavity barrier may be omitted where full fill mineral 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



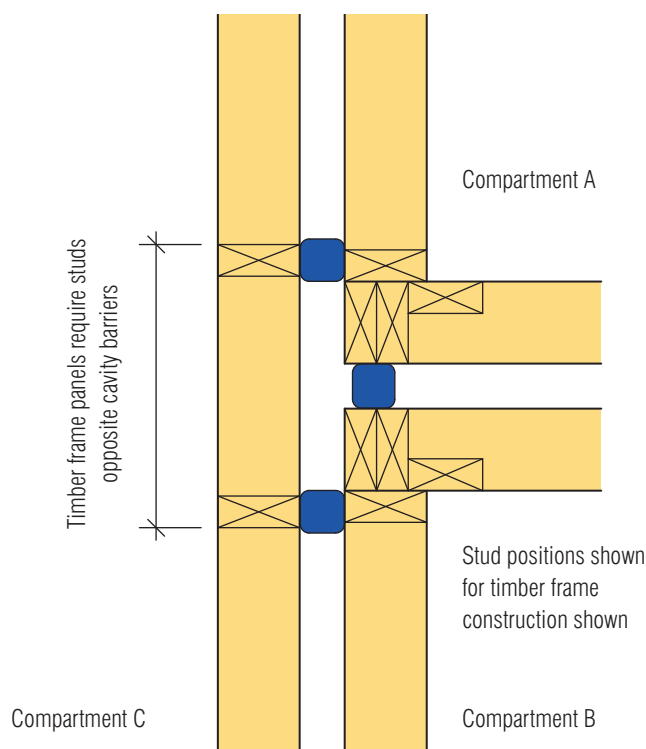
Corner option

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



D15i: Plan view of internal compartment wall T-junction (option 1)

DETAIL NOTES:

Drylining and insulation omitted for clarity

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

Fire stop may already be incorporated by full fill mineral wool

*Cavity barrier in this zone to be backed by solid timber of at least full depth of the structural wall and 35mm wide**

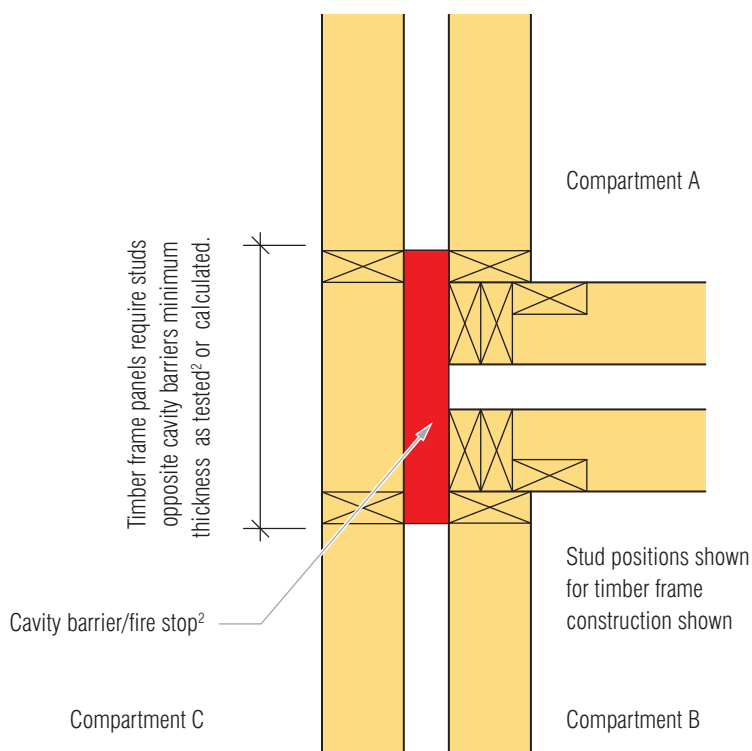
DETAIL INTENTION:

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. The two cavity barriers in any one direction being an industry acceptable practice in guidance and providing the effective fire stop between dwellings when used in pairs in any one direction at a time.

** 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 wider timber support.*



D15: I-CB-internal compartment wall T-junction cont.../



D15ii: Plan view of internal compartment wall T-junction (option 2)

NOTES:

² Cavity barrier is acting as a fire stop and shall be suitable product for this application (test certificate)

DETAIL NOTES:

Drylining and insulation omitted for clarity

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

Fire stop may already be incorporated by full fill mineral wool

*Cavity barrier in this zone to be backed by solid timber of at least full depth of the structural wall and 35mm wide**

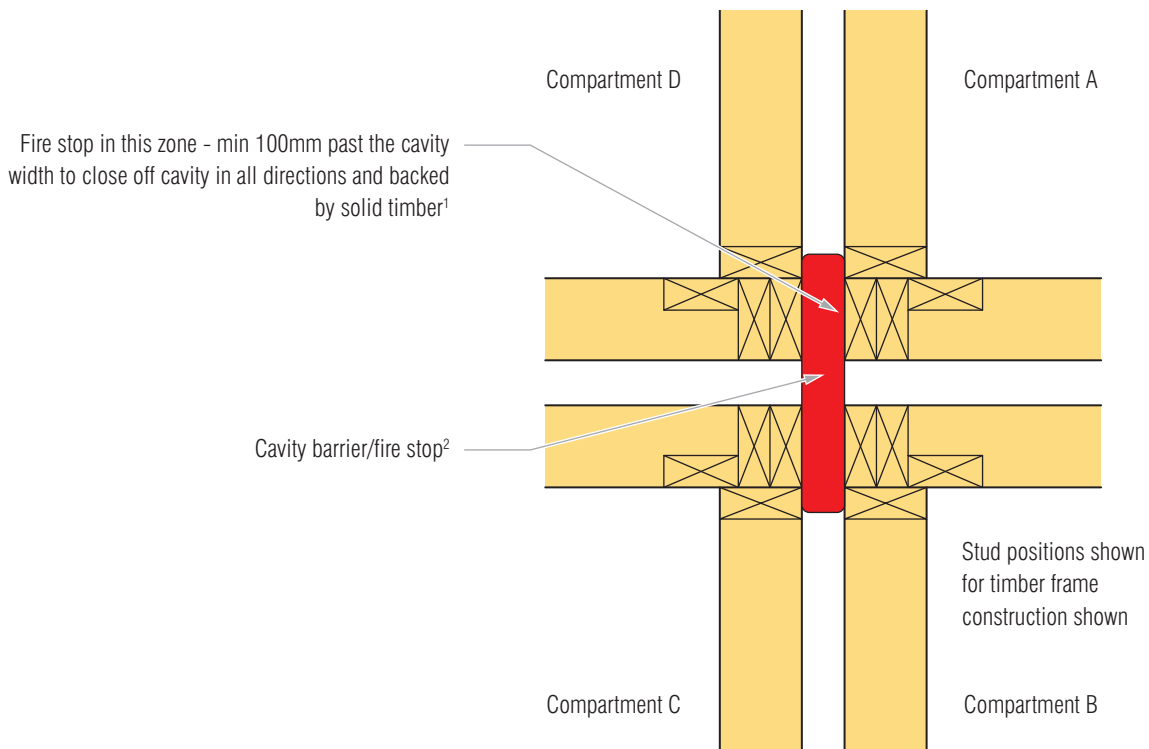
DETAIL INTENTION:

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

** 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 wider timber support.*



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



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 wider timber support.
- ² Cavity barrier is acting as a fire stop and shall be suitable product for this application (test certificate)

D16: Plan view of internal compartment wall X-junction

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

DETAIL INTENTION:

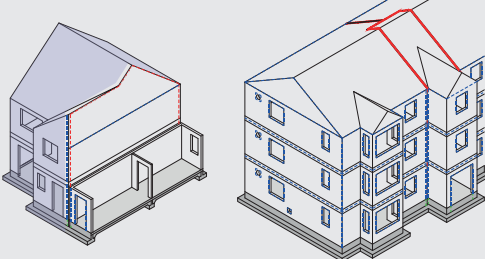
Spreading from one compartment to the next through an uninsulated the compartment cavity space abutting the junction of the dwellings.



Part 5 - Cavity barrier installation care points

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	Provide details taking account of tolerances and project details. See Part 4 of guidance for additional information
3	Provide specification cavity barrier types and fire stopping types	<p>Select cavity barriers with appropriate compliance certification; test certificates from UKAS test authority</p> <p>Refer to manufacture's literature for tests to BS or EN standards and compliance for the actual application being designed</p> <p>Check where appropriate, if construction element fulfilling another use will also provide the cavity barrier</p>
4	Undertake the designer's checklist - see following page	Recommendation to incorporate as part of the company STA quality procedures for future checks
5	Tender details to include a sign off strategy for auditing the correct installation of cavity barriers and fire stopping	Recommendation to engage with an STA member company under STA Assure training and installation audit process for relevant cavity barriers and fire stopping installation

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.




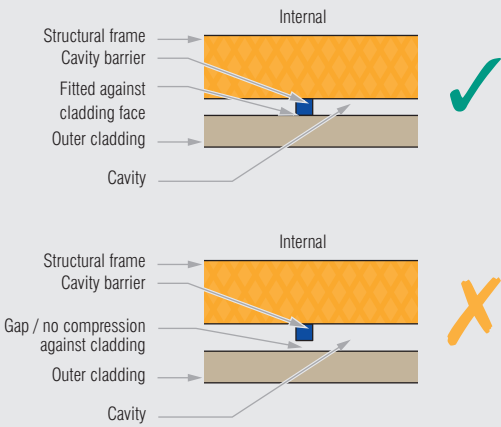
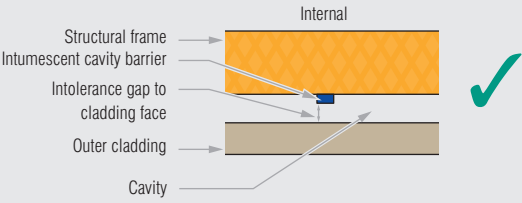
Checklist for designers

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 floor levels	<input type="checkbox"/>
At party walls	<input type="checkbox"/>
At centres on plan no more than 10m /20m	<input type="checkbox"/>
At roof eaves/upper ceiling level	<input type="checkbox"/>
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 Fire stopping materials are to be suitable for irregular spaces and suitable / test certificate for the application Reference guidance on fire stopping. <i>Association for Specialist Fire Protection (ASFP) website (www.asfp.org)</i>	<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 	
ALTERNATIVE DESIGN APPROACH	
BS 9999 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"/>





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>STA - cavity barrier installer card</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 	
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 	

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.









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) For 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

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.










Care points for masonry cladding: brick/block/stone layers²

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 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 has 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	 

² 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.








Care points for external cladding installers²

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 has 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	

² 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.







Care points for roofing contractors installing felt/battens and tiles²

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	 STOP
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	 

² 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.



Care points for soffit eaves verge installers²

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	 STOP
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	 

² 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.



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, Parts 1 & 2 - 2020, www.planningportal.gov.uk
- [6] Scotland Building Standards Technical Handbook Section 2 - 2019, 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

Appendix: 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



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