

Module 10.1

Approved construction details

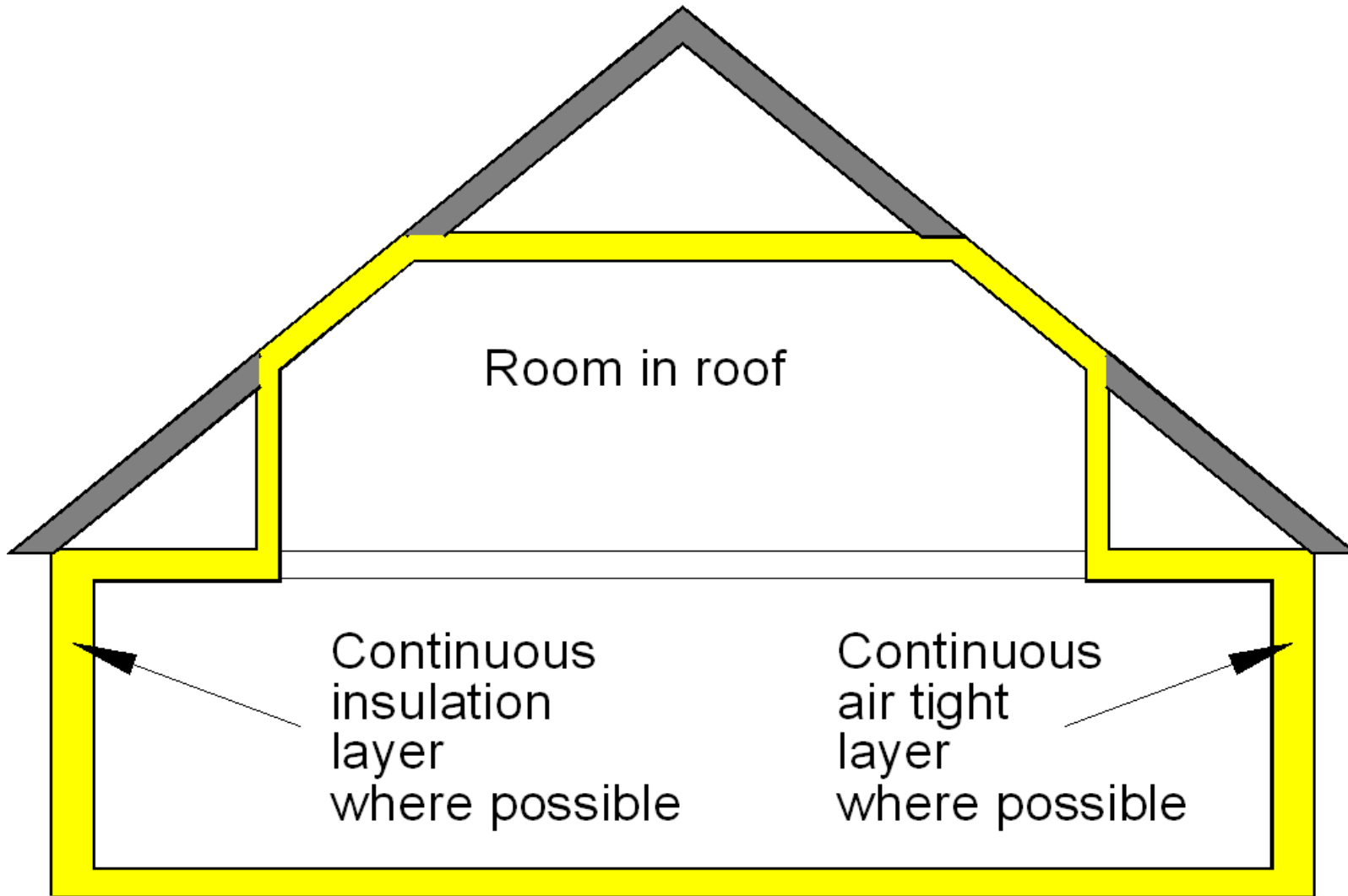
Learning Outcomes

- On successful completion of this module learners will be able to
 - Describe approved construction details to reduce thermal bridging and improve structural air tightness.

General requirements.

- As part of their duties, everyone involved in the construction of a building must try to minimise thermal bridging and maximise structural air tightness.
- Wherever possible, the building should be surrounded in a continuous insulation layer.
- Also, wherever possible, the building should be surrounded by a continuous airtight layer.
- Obviously these layers must be broken for windows, doors and penetrations for services.

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- The near continuous insulation layer reduces heat loss by reducing thermal bridging.
- The continuous airtight layer reduces drafts and so reduces the amount of cold outside air entering the building.
- Great care must be taken by everyone involved to correctly
 - i) install,
 - ii) verify,
 - iii) maintain,

both the insulation envelope and the air tight envelope.

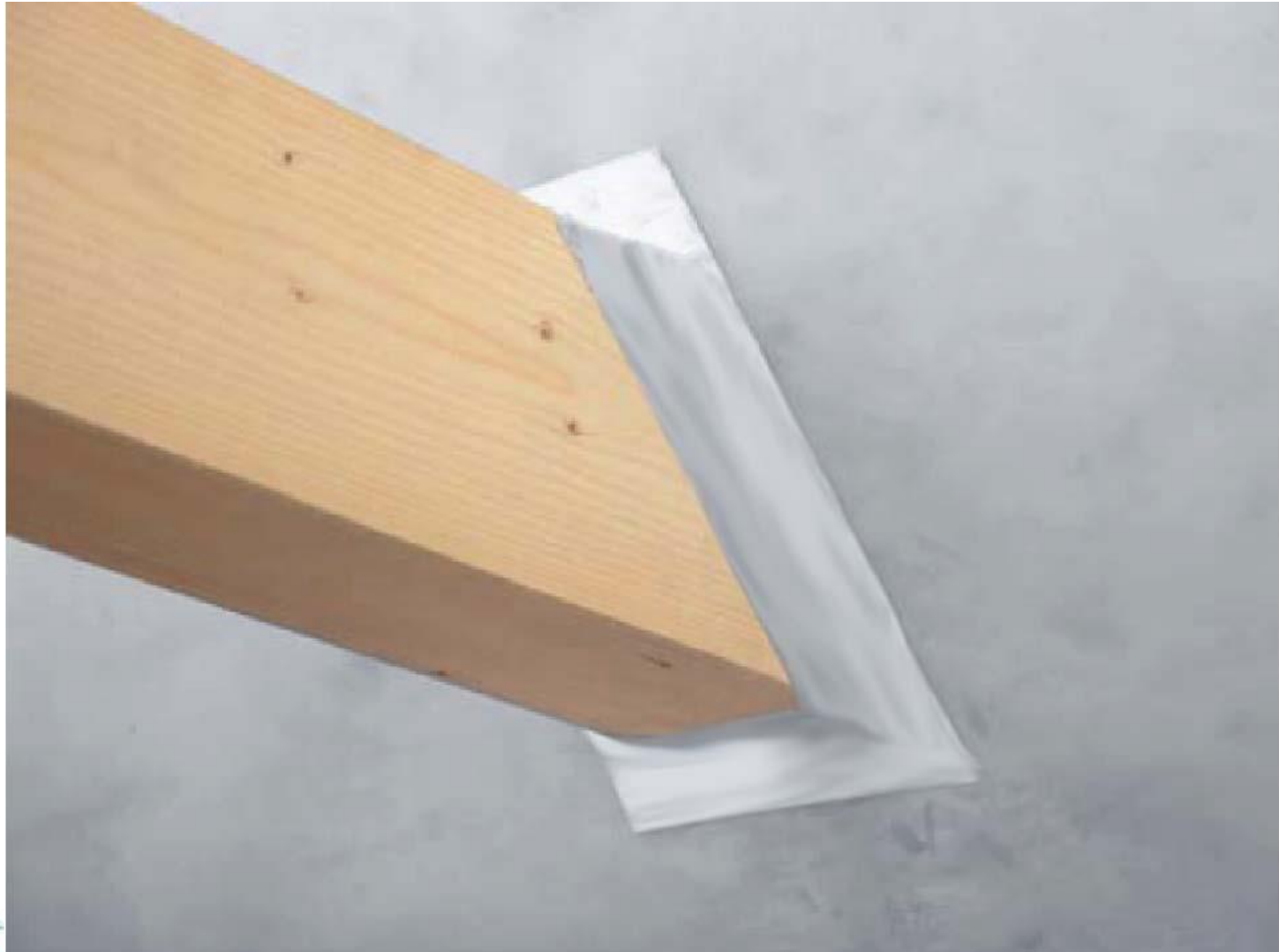
Sealing at intermediate floors: First stage: point up around joists



Sealing at intermediate floors: Second stage: tape joists to wall



Sealing the junction between a joist and an external wall



Sealing where pipes enter the roofspace



Sealing under way at junction of timber frame wall and external wall ope



Sealing around connection to electrical socket outlet



Sealing around frame of access hatch to attic



- Some European countries have developed “Accredited construction details” to show designers and builders examples of good practice to minimize thermal bridging of insulation layers and to achieve air tightness of buildings.
- Information presented in this module may not be appropriate to all European countries.
- Learners may wish to use material which is more relevant to their country.

Source of accredited construction details.

- Source Denmark - Not found.
- Source France - Not found.
- Source Spain - Not found.
- Source Germany.

Passivhaus Institut - '*Protokollband #16*'

reference – ASEIPI P189 Section 4.

- Source Ireland.

<http://www.environ.ie/en/Publications/DevelopmentandHousing/BuildingStandards/>

- continued.

- Source United Kingdom.

<http://www.planningportal.gov.uk/england/professionals/buildingregs/technicalguidance/bcconsfpartl/bcassociateddocuments9/bcptlaccdet/>

- Source Scotland.

<http://www.scotland.gov.uk/Resource/Doc/217736/0088295.pdf>

- continued.

- Buildings using these “Accredited construction details” will reduce heat loss by achieving
 - a) Less thermal bridging.
 - b) Increased air tightness.

Format of Accredited Construction Details

- For the UK, Ireland and Scotland, the Accredited Construction Details take the form of labelled diagrams showing the recommended installation details for various types and areas of construction.
- Actual installation details for each of the countries are listed on the following slides.
- Details and guidelines developed in the UK and Ireland combine a diagram and checklist approach where tick boxes can be completed to verify checking and correct installation.

United Kingdom – Accredited Construction Details

Section	Description	
Section 1	Introduction and general theory	17 pages
Section 2	Masonry cavity wall insulation illustrations	33 diagrams
	Masonry external wall insulation illustrations	29 diagrams
	Masonry internal wall insulation illustrations	33 diagrams
	Steel frame illustrations	25 diagrams
	Timber frame illustrations	26 diagrams

Ireland – Accredited Construction Details

Section	Description	
n/a	Limiting Thermal Bridging and Air Infiltration	47 pages
G - General	Walls – General details	5 pages
Section 1	Walls – Insulation in cavity	29 diagrams
Section 2	Walls – External insulation	25 diagrams
Section 3	Walls – Internal insulation	26 diagrams
Section 4	Timber Frames	23 diagrams
Section 5	Steel Frames	22 diagrams
Section 6	Walls – Internal Insulation	22 diagrams

Scotland – Accredited Construction Details

Section	Description	
Section 1	Introduction and Supplementary Guidance	7 pages
Section 2	Masonry: External wall insulation	20 diagrams
Section 3	Masonry: Cavity wall insulation: Full fill.	22 diagrams
Section 4	Masonry: Cavity wall insulation: Partial fill.	22 diagrams
Section 5	Masonry: Internal wall insulation	20 diagrams
Section 6	Timber Frames	19 diagrams
Section 7	Steel Frames	19 diagrams
Section 8	General arrangements – future developments, roof windows, level thresholds, service penetrations in ceilings	8 diagrams

Examples of construction details which help reduce thermal bridging.

- The following pages show a number of extracts from “Acceptable construction details” for Ireland and “Accredited construction details” for Scotland.
- These examples shown here are only a small sample of all the details available.
- Construction methods may vary between countries and so the details shown here may not be practical in all cases.
- Participants are advised seek out similar approved construction details in their own areas.

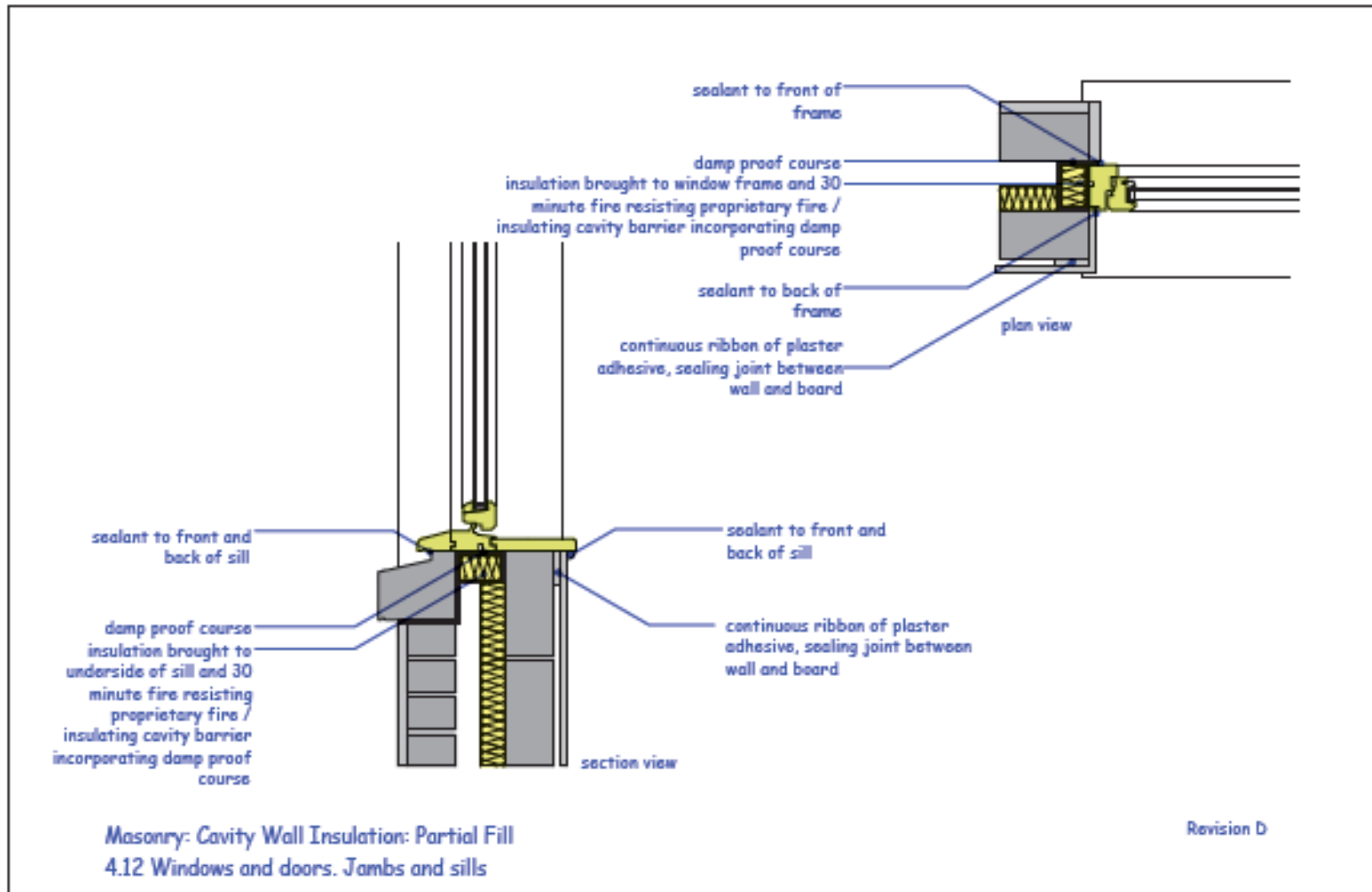
Example – Ireland – Insulation in cavity

(1) WALLS:- INSULATION IN CAVITY		Ope - Jamb with closer block	DETAIL 1.24, JULY 2008
<p>THERMAL PERFORMANCE CHECKLIST (TICK ALL)</p> <p><input type="checkbox"/> Ensure partial fill insulation is secured firmly against inner leaf of cavity wall</p> <p><input type="checkbox"/> Install proprietary cavity closer or block of insulation with path of minimum thermal resistance through the closer of not less than $0.45\text{m}^2\text{ K/W}$ (manufacturer's certified data)</p> <p><small>Complying with checklist qualifies builder to claim ψ value in Table 3 of IP 1/06 and Table K1 of DEAP 2006</small></p>		<p>AIR BARRIER - CONTINUITY CHECKLIST (TICK ALL)</p> <p><input type="checkbox"/> Seal all penetrations through air barrier using a flexible sealant</p> <p><input type="checkbox"/> Apply flexible sealant to all interfaces between internal air barrier and window / door frame members</p> <p><input type="checkbox"/> If a proprietary cavity closer is used, when forming the air barrier to the walls with a blockwork inner leaf or a scratch coat on blocks, install a flexible sealant between the cavity closer and blockwork wall</p> <p><small>Complying with checklist will help achieve design air permeability</small></p>	
<p>GENERAL NOTES</p> <p>Keep cavities clean of mortar snots and other debris during construction</p>	<p>OPTION (TICK ONE)</p> <p>AIR BARRIER - OPTIONS</p> <p><input type="checkbox"/> Masonry inner leaf with wet-finish plaster, or</p> <p><input type="checkbox"/> Masonry inner leaf with scratch coat, and finished with plasterboard, or</p> <p><input type="checkbox"/> Inner leaf with plasterboard on dabs, with continuous ribbon of adhesive tape around all openings, along top and bottom of wall, and at internal and external corners, or</p> <p><input type="checkbox"/> Airtightness membrane and tapes</p>		
ACCEPTABLE CONSTRUCTION DETAIL		Ope - Jamb with closer block	

Example – Ireland – Insulation in cavity

(1) WALLS:- INSULATION IN CAVITY		Ope - Concrete Forward Sill	DETAIL 1.26, JULY 2008
<p>THERMAL PERFORMANCE CHECKLIST (TICK ALL)</p> <p><input type="checkbox"/> Install proprietary cavity closer or block of insulation with path of minimum thermal resistance through the closer of not less than $0.45\text{m}^2\text{ K/W}$ (manufacturer's certified data)</p> <p><input type="checkbox"/> Ensure partial fill insulation is secured firmly against inner leaf of cavity wall</p> <p><small>Complying with checklist qualifies builder to claim ψ value in Table 3 of IP 1/06 and Table K1 of DEAP 2006</small></p>		<p>AIR BARRIER - CONTINUITY CHECKLIST (TICK ALL)</p> <p><input type="checkbox"/> Seal all penetrations through air barrier using a flexible sealant</p> <p><input type="checkbox"/> Apply flexible sealant to junctions between plaster/plasterboard and sill board, and between sill board and window frame</p> <p><input type="checkbox"/> Ensure air barrier continuity between the window and the wall air barrier line</p> <p><input type="checkbox"/> If forming the wall air barrier with a blockwork inner leaf or with scratch coat on blockwork, install a flexible sealant between the cavity closer and blockwork wall</p> <p><small>Complying with checklist will help achieve design air permeability</small></p>	
<p>GENERAL NOTES</p> <p>Keep cavities clean of mortar spots and other debris during construction</p>	<p>AIR BARRIER - OPTIONS OPTION (TICK ONE)</p> <p><input type="checkbox"/> Masonry inner leaf with wet-finish plaster, or</p> <p><input type="checkbox"/> Masonry inner leaf with scratch coat, and finished with plasterboard, or</p> <p><input type="checkbox"/> Inner leaf with plasterboard on dabs, with continuous ribbon of adhesive tape around all openings, along top and bottom of wall, and at internal and external corners, or</p> <p><input type="checkbox"/> Airtightness membrane and tapes</p>		
ACCEPTABLE CONSTRUCTION DETAIL		Ope - Concrete Forward Sill	

Example – Scotland – Insulation in cavity



This detail is a constituent component of the SBSA, Technical Guide : Accredited Construction Details (Scotland) and should be used only after reference to the introduction and the supplementary guidance where the relevance and any limitations on the use of this detail are set out.

Example – Ireland – Timber frame

(4) TIMBER FRAME		Ope - Jamb	DETAIL 4.21, JULY 2008
<p style="color: red; text-align: center;">THERMAL PERFORMANCE CHECKLIST (TICK ALL)</p> <p>Install proprietary cavity closer with thermal resistance path through closer of 0.45 m² K/W or better (Manufacturers' certified data) OR treated timber batten</p> <p style="color: red; font-size: small;">Complying with checklist qualifies builder to claim ψ value in Table 3 of IP 1/06 and Table K1 of DEAP 2006</p>		<p style="color: blue; text-align: center;">AIR BARRIER - CONTINUITY CHECKLIST (TICK ALL)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Seal all penetrations through air barrier using a flexible sealant or tape <input type="checkbox"/> Apply flexible sealant to junction between lining, and frame members <input type="checkbox"/> Apply external flexible seal around frame <p style="color: blue; font-size: small;">Complying with checklist will help achieve design air permeability</p>	
<p>GENERAL NOTES</p> <p>Ensure vapour control layer or vapour control plasterboard is returned into reveal</p>	<p style="color: blue; text-align: center;">AIR BARRIER - OPTIONS OPTION (TICK ONE)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Internal lining, for example, plasterboard, or <input type="checkbox"/> Airtightness membrane and tapes <p style="color: blue; font-size: small;">An effective vapour control layer may act as an airtightness membrane</p>		

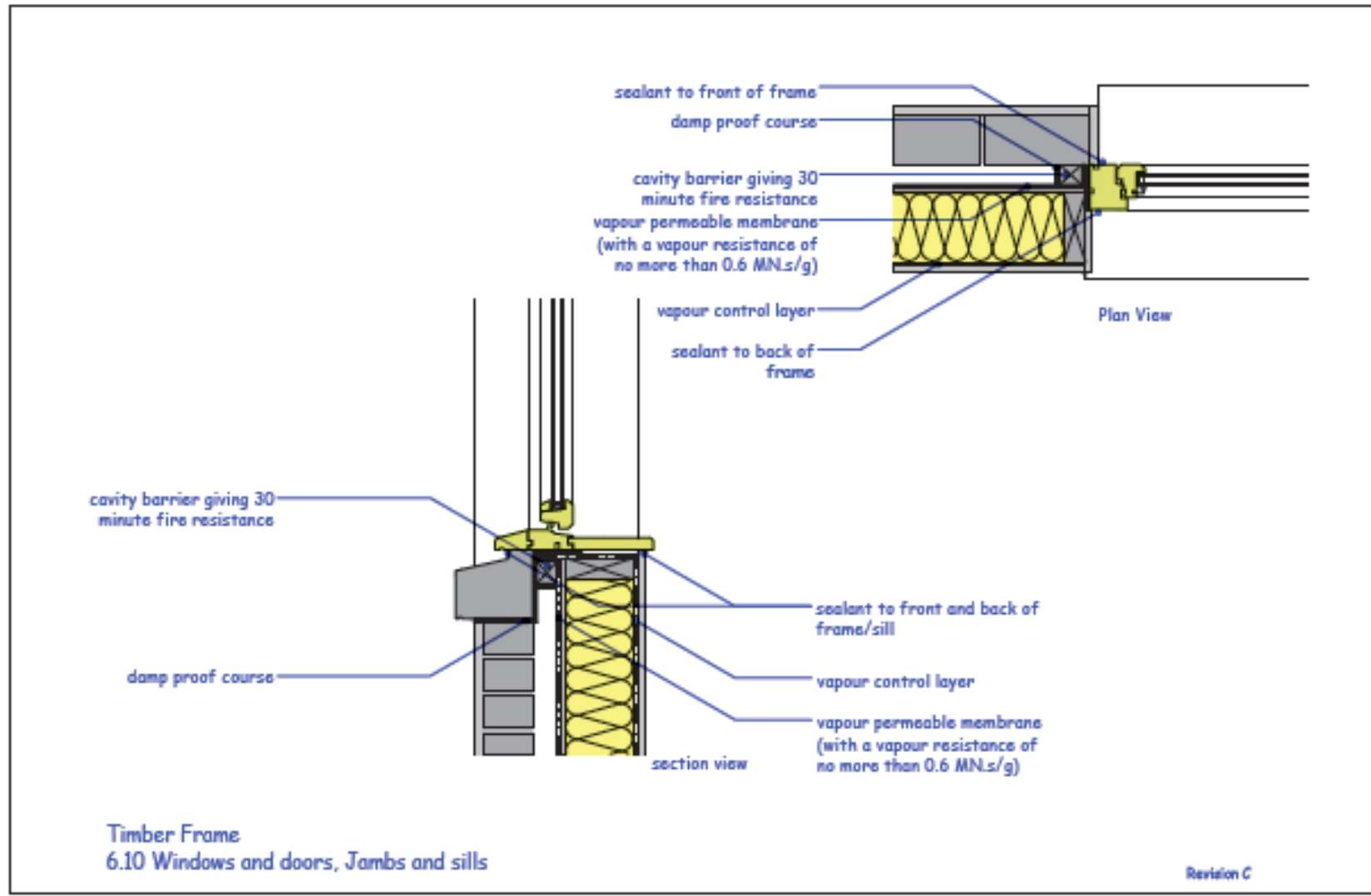
ACCEPTABLE CONSTRUCTION DETAIL

Ope - Jamb

Example – Ireland – Timber frame

(4) TIMBER FRAME		Ope - Sill	DETAIL 4.22, JULY 2008
<p style="color: red;">THERMAL PERFORMANCE CHECKLIST (TICK ALL)</p> <p>Ensure insulation brought tight to underside of sill plate <input type="checkbox"/></p> <p style="color: red; font-size: small;">Complying with checklist qualifies builder to claim ψ value in Table 3 of IP 1/06 and Table K1 of DEAP 2006</p>		<p style="color: blue;">AIR BARRIER - CONTINUITY CHECKLIST (TICK ALL)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Apply flexible sealant to junction between lining and windowboard, and between windowboard and frame <input type="checkbox"/> Ensure air barrier continuity between wall linings and frame <input type="checkbox"/> Apply external flexible seal around frame <input type="checkbox"/> Seal all penetrations through air barrier using a flexible sealant or tape <p style="color: blue; font-size: small;">Complying with checklist will help achieve design air permeability</p>	
<p>GENERAL NOTES</p> <p>Ensure vapour control layer or vapour control plasterboard is returned into reveal</p>	<p style="color: blue; font-size: small;">OPTION (TICK ONE)</p> <p style="color: blue;">AIR BARRIER - OPTIONS</p> <ul style="list-style-type: none"> <input type="checkbox"/> Internal lining, for example, plasterboard, or <input type="checkbox"/> Airtightness membrane and tapes <p style="color: blue; font-size: small;">An effective vapour control layer may act as an airtightness membrane</p>		
ACCEPTABLE CONSTRUCTION DETAIL		Ope - Sill	

Example – Scotland – Timber frame

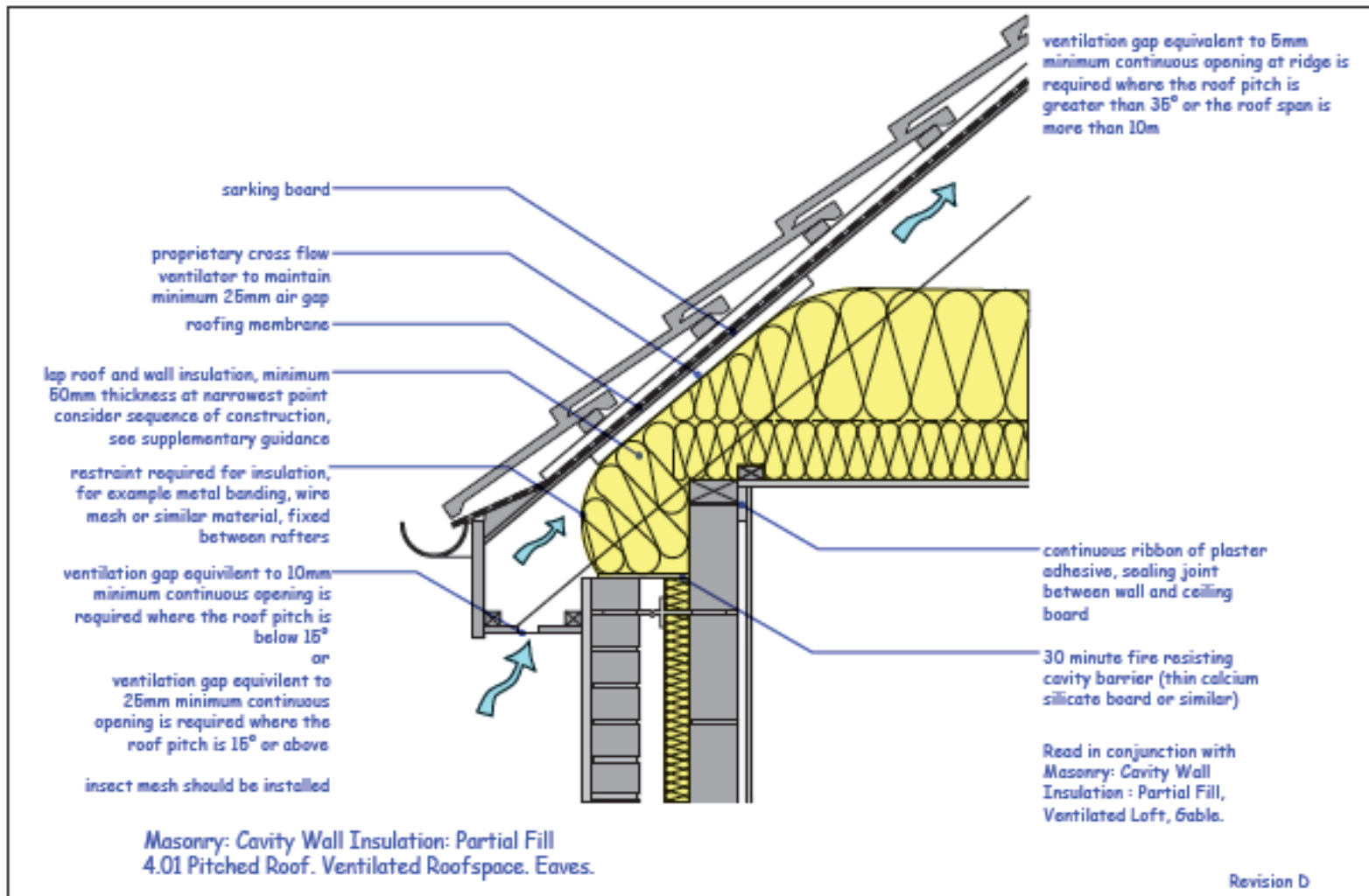


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Example – Ireland - Eaves

(1) WALLS:- INSULATION IN CAVITY	Eaves - Ventilated Attic	DETAIL 1.09, JULY 2008
<p>THERMAL PERFORMANCE</p> <p>CHECKLIST (TICK ALL)</p> <p>Ensure continuity of insulation throughout junction <input type="checkbox"/></p> <p>Ensure full depth of insulation between and over joists abuts eaves insulation <input type="checkbox"/></p> <p>Ensure gap between wall plate and proprietary eaves vent is completely filled with insulation having a min. R-value across the insulation thickness of 1.2 m²K/W <input type="checkbox"/></p> <p>Ensure partial fill insulation is secured firmly against inner leaf of cavity wall. If using partial fill insulation, tuck compressible insulation down into the head of the cavity <input type="checkbox"/></p> <p><i>Complying with checklist qualifies builder to claim ψ value in Table 3 of IP 1/06 and Table K1 of DEAP 2006</i></p>		<p>AIR BARRIER - CONTINUITY</p> <p>CHECKLIST (TICK ALL)</p> <p><input type="checkbox"/> Bed wall plate on continuous mortar bed</p> <p><input type="checkbox"/> Fix ceiling first, and seal all gaps between ceiling and masonry wall with either plaster, adhesive or flexible sealant</p> <p><input type="checkbox"/> Seal all penetrations through air barrier using a flexible sealant</p> <p><i>Complying with checklist will help achieve design air permeability</i></p>
<p>GENERAL NOTES</p> <p>Thermal performance of junction can be improved by incorporating an eaves wind barrier (plywood, OSB, softboard or other suitable material) around insulation to be sealed to connect with the ventilator strip thereby mitigating wind chill from the vent inlet in the eaves</p> <p>Keep cavities clean of mortar snots and other debris during construction</p> <p>Use of over joist insulation is considered best practice, as it eliminates the cold bridge caused by the joist</p> <p>Use a proprietary eaves ventilator to ensure ventilation in accordance with BS5250. Installation of the eaves ventilator must not prevent free water drainage below the tiling battens</p> <p>Ensure cavity is closed with firestopping insulant or proprietary cavity barrier</p> <p>Read this detail in conjunction with detail 1-15, Roof at Attic Floor Level</p>	<p>AIR BARRIER - OPTIONS</p> <p>OPTION (TICK ONE)</p> <p><input type="checkbox"/> Masonry inner leaf with wet-finish plaster, or</p> <p><input type="checkbox"/> Masonry inner leaf with scratch coat, and finished with plasterboard, or</p> <p><input type="checkbox"/> Inner leaf with plasterboard on dabs, with continuous ribbon of adhesive tape around all openings, along top and bottom of wall, and at internal and external corners, or</p> <p><input type="checkbox"/> Airtightness membrane and tapes</p>	
<p>ACCEPTABLE CONSTRUCTION DETAIL Eaves - Ventilated Attic</p>		

Example – Scotland - Eaves



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References – continued.

- <http://www.environ.ie/en/Publications/DevelopmentandHousing/BuildingStandards/>
- <http://www.planningportal.gov.uk/england/professionals/buildingregs/technicalguidance/bcconsfpartl/bcassociateddocuments9/bcptlaccdet/>
- <http://www.scotland.gov.uk/Resource/Doc/217736/0088295.pdf>