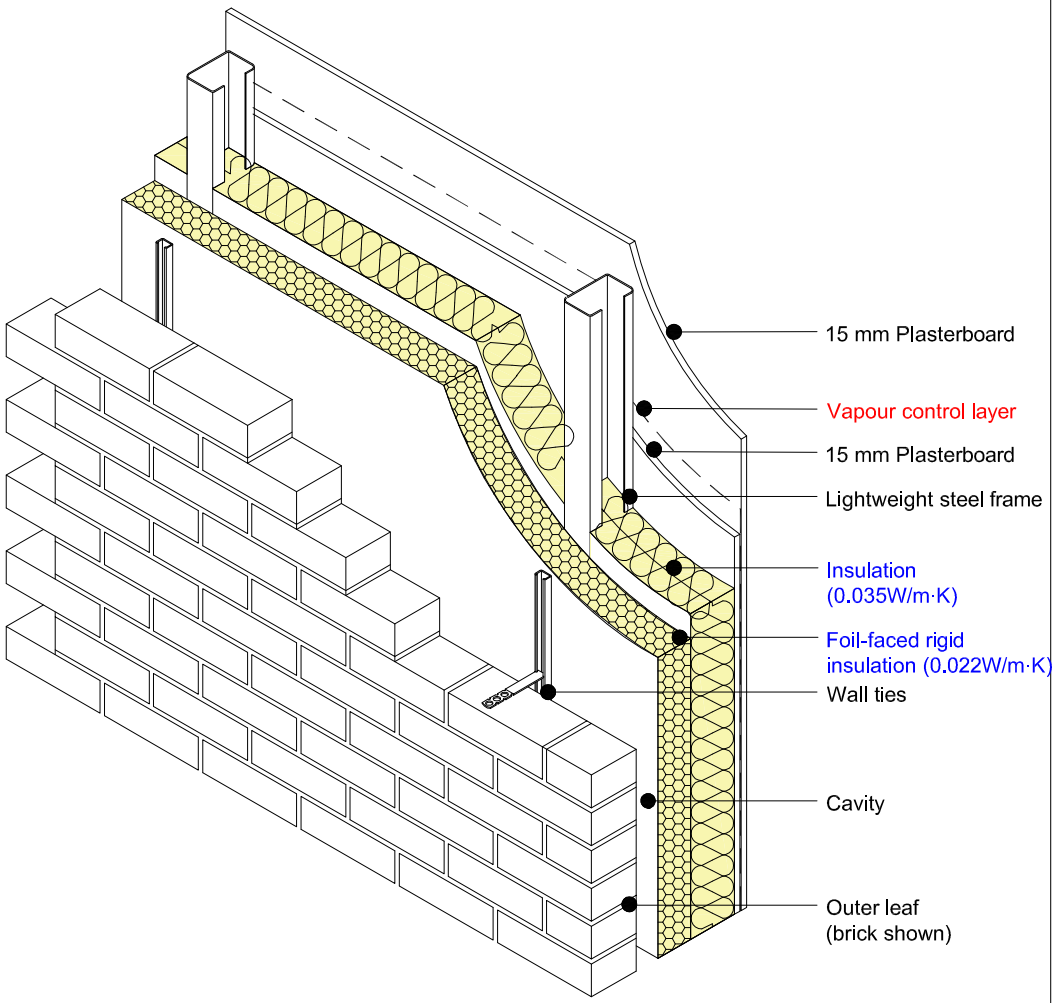
Legend

- Mineral wool insulation zone
- Rigid insulation zone
- Air tightness barrier (note: this can also act as a vapour control layer)
- Blue text — Guidance on thermal continuity
- Red text — Guidance on air tightness



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

General guidance notes

Alternative constructions

1. This set of details uses rigid insulation fixed to the outside face of a lightweight steel frame and mineral wool insulation within the frame to achieve the U-value required to meet the technical standards. If other types of insulation are used then new Ψ-value calculations will be required.
2. Different constructions can be used to provide an outer leaf but check that there is sufficient ventilation provision to prevent moisture from being trapped within the wall.

Condensation Risks

3. The air tightness barrier used in the external wall details is provided by taping the vapour control layer located between plasterboard sheets at all junctions between boards, floors and ceilings.
4. There is a high risk of condensation forming within this type of construction if the air tightness layer is not continuous. All services penetrations must be sealed to the vapour control layer forming the air tightness barrier.

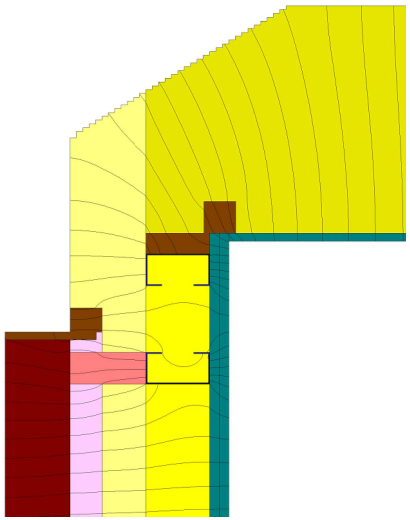
Sealing membrane junctions

5. All membranes should be taped, stapled or bedded in adhesive as identified by manufacturer. Repair all tears in membranes before commencing next stage of work.

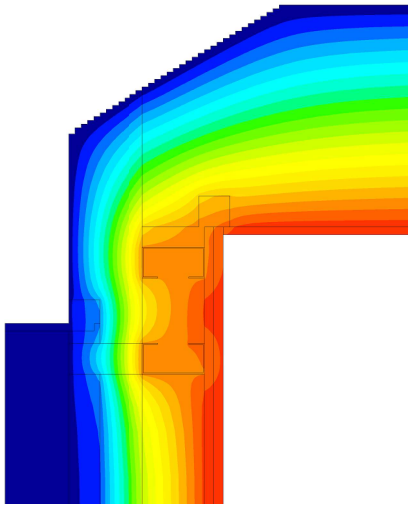
Ψ-value calculations

6. For details of all thermal conductivity values of materials used in the psi-value calculations, see also Appendix B of the Introduction.

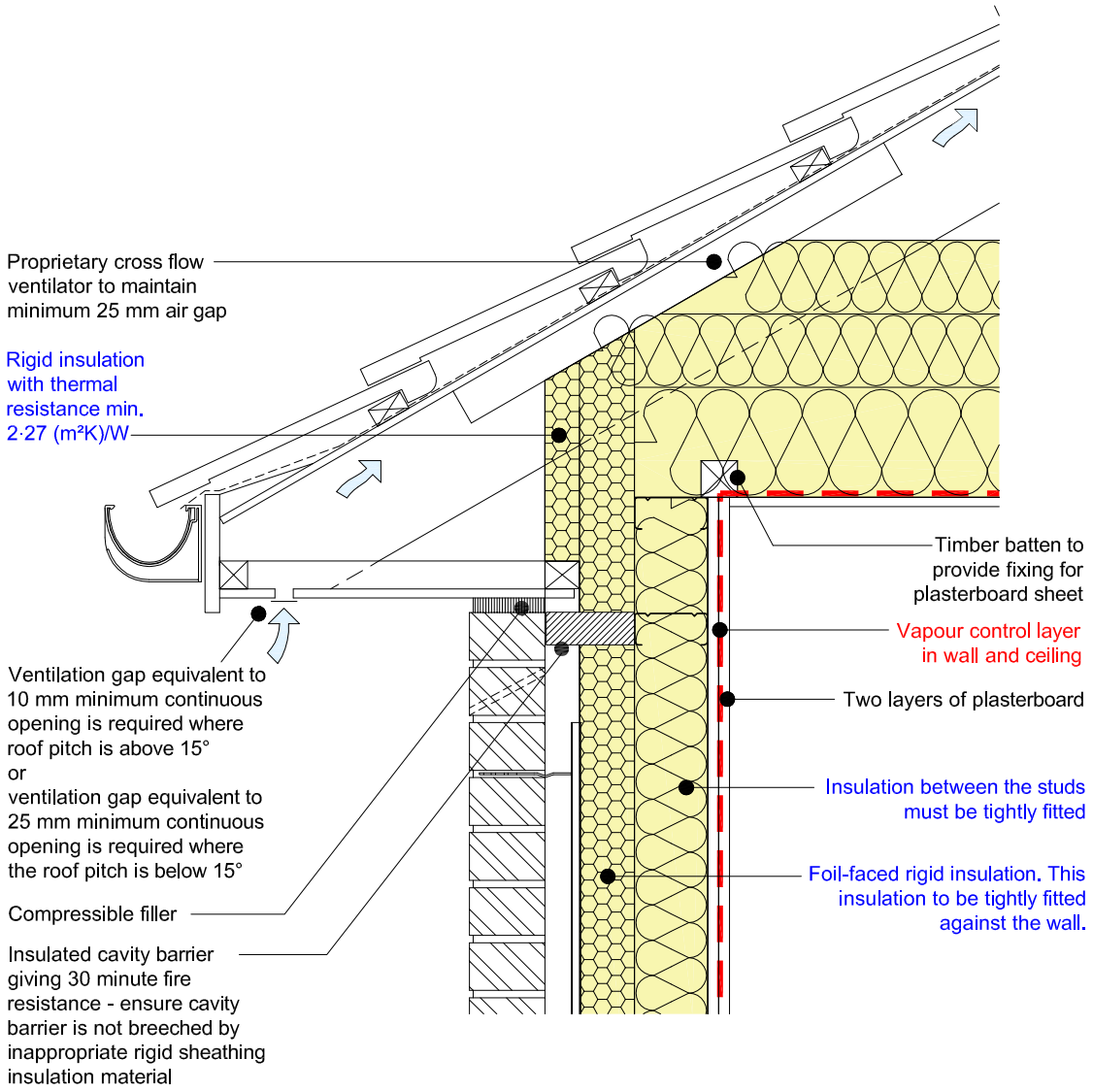
Build-Up of Steel Frame External Wall
Isometric cut-away view



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W
Roof - 9·00 (m²K)/W

Critical features

1. Ensure that insulation layers in roof are fitted perpendicularly, to cover junctions
2. Ensure that roof insulation fully laps steel frame insulation
3. Ensure that insulation is tightly fitted.

Airtightness checklist

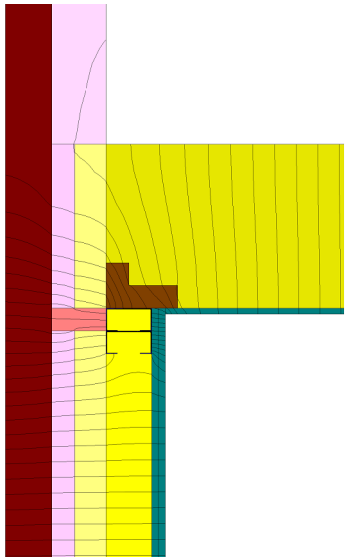
1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

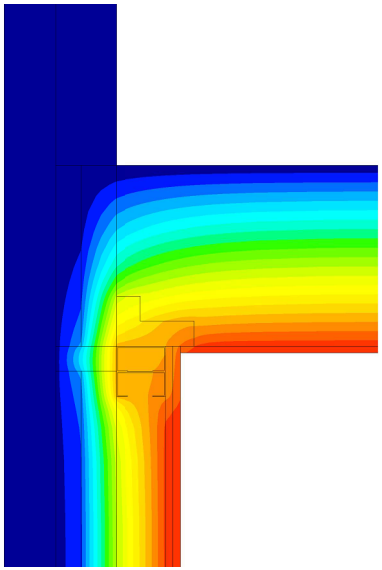
1. Check ventilation paths are clear before installing insulation above the ceiling.
2. Install cavity barrier at the top of the wall.
3. Ventilation gap equivalent to 5 mm minimum continuous opening at ridge is required where the roof pitch is greater than 35° or the roof space is more than 10 m.

Ψ value = 0·051 W/m·K
Temp. factor = 0·94

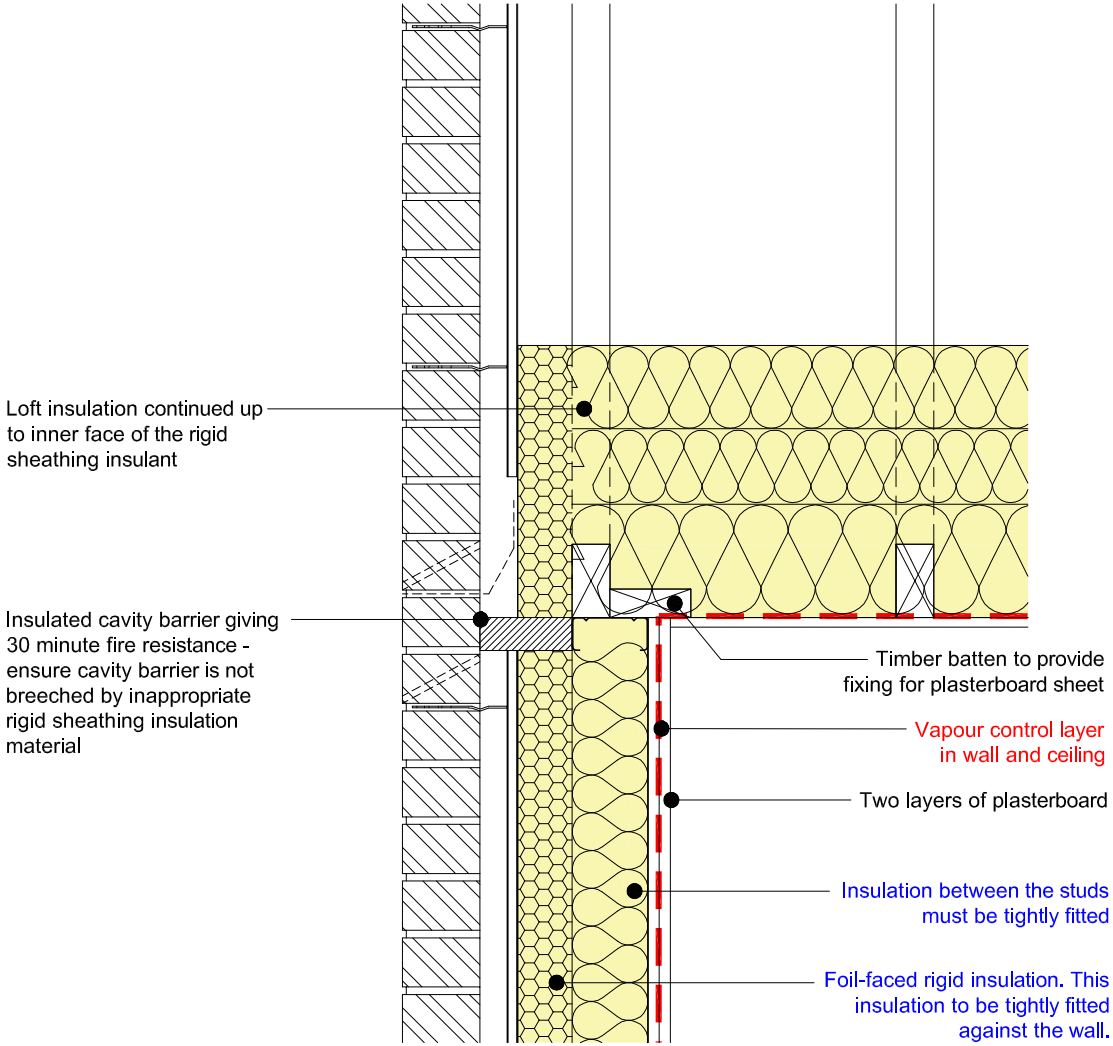
Steel Frame: Steel Framing Sections
Pitched Roof: Ventilated Roofspace - Eaves (Section view)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W
Roof - 9·00 (m²K)/W

Critical features

1. Ensure that insulation layers in roof are fitted perpendicularly, to cover junctions.
2. Ensure that roof insulation fully laps steel frame insulation.
3. Ensure that insulation is tightly fitted

Airtightness checklist

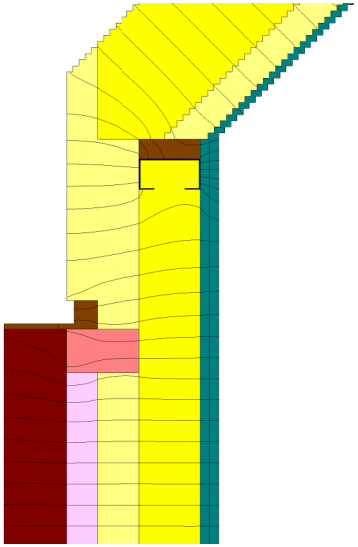
1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

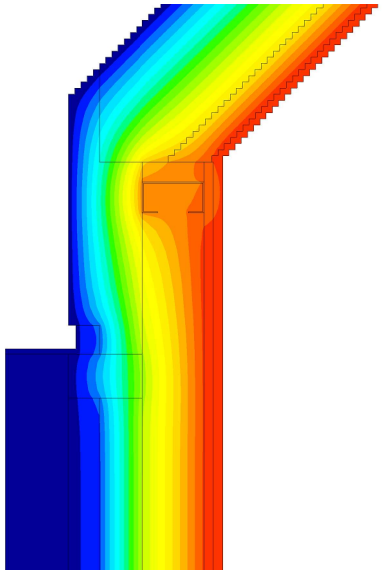
1. Check ventilation paths are clear before installing insulation above the ceiling.
2. Install cavity barrier at the top of the wall.

Ψ value = 0·056 W/m·K
Temp. factor = 0·93

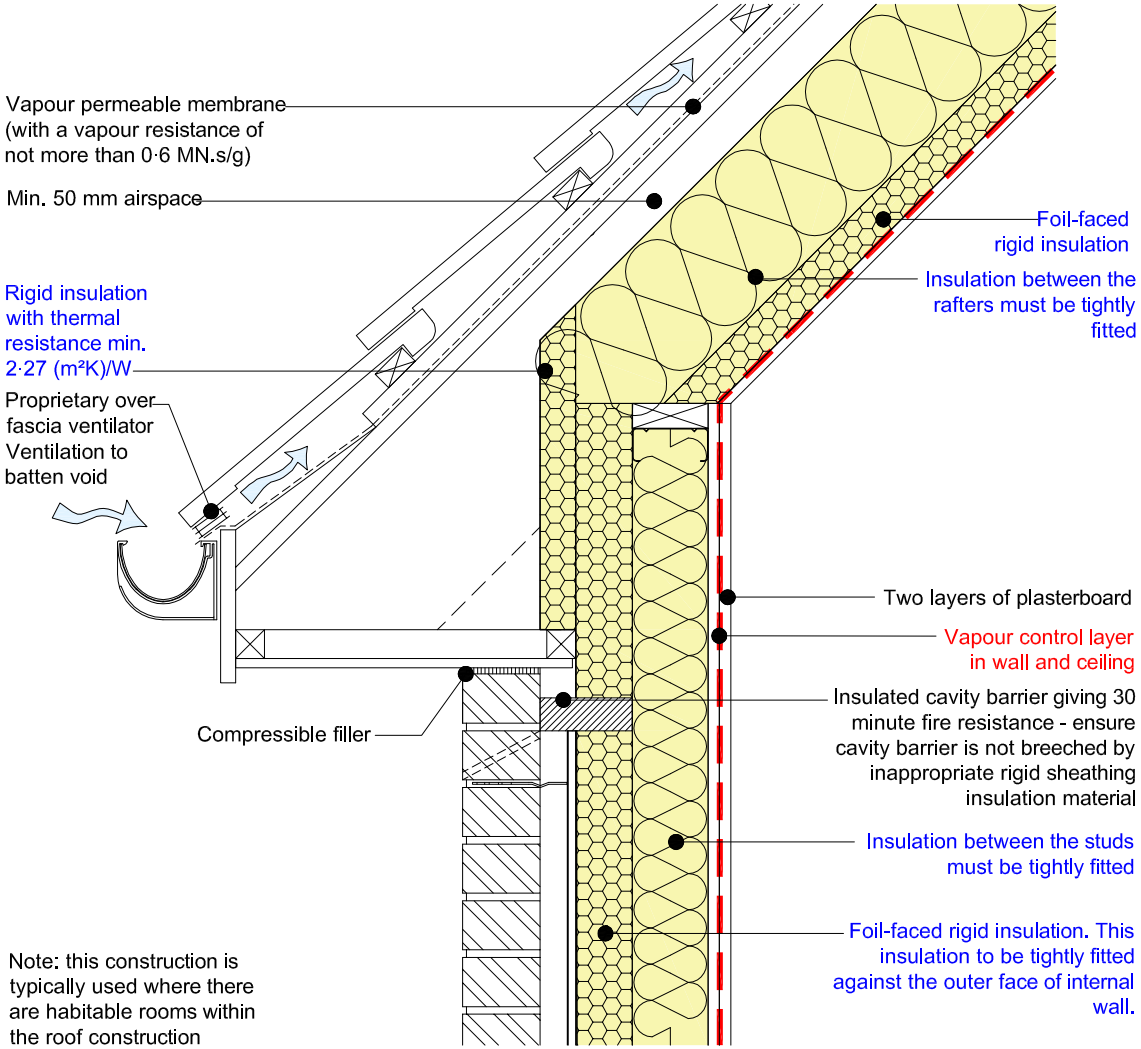
Steel Frame: Steel Framing Sections
Pitched Roof: Ventilated Roofspace - Gable (Section view)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



Note: this construction is typically used where there are habitable rooms within the roof construction

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

- Wall (cavity) - 3·18 (m²K)/W
- Wall (between studs) - 2·86 (m²K)/W
- Roof (between rafters) - 6·48 (m²K)/W
- Roof (below rafters) - 2·27 (m²K)/W

Critical features

1. Ensure that roof insulation overlaps the top of the steel frame wall, with minimum 50mm overlap at the narrowest point.
2. Ensure that insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

1. Check ventilation paths are clear before installing insulation above the ceiling.
2. Install cavity barrier at the top of the wall.
3. Ventilation gap equivalent to 5mm minimum continuous opening is required at ridge batten space.

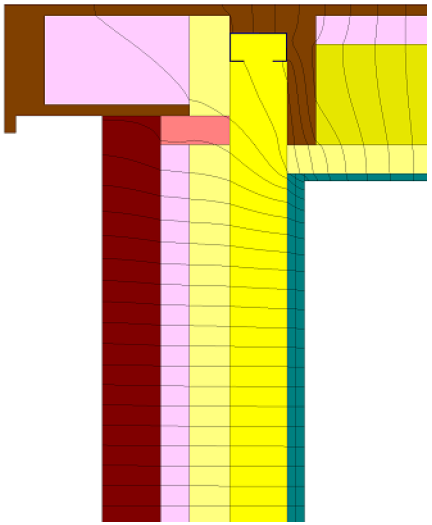
Ψ value = 0·018 W/m·K
Temp. factor = 0·96

Steel Frame: Steel Framing Sections

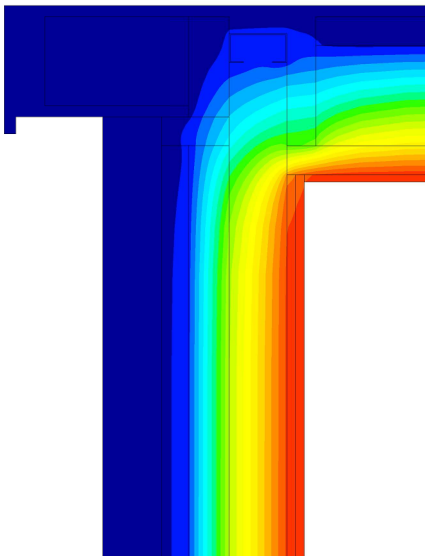
Pitched Roof: Ventilated Batten Void (warm roof) - Eaves (Section view)

ACDs in support of 2015 energy standards

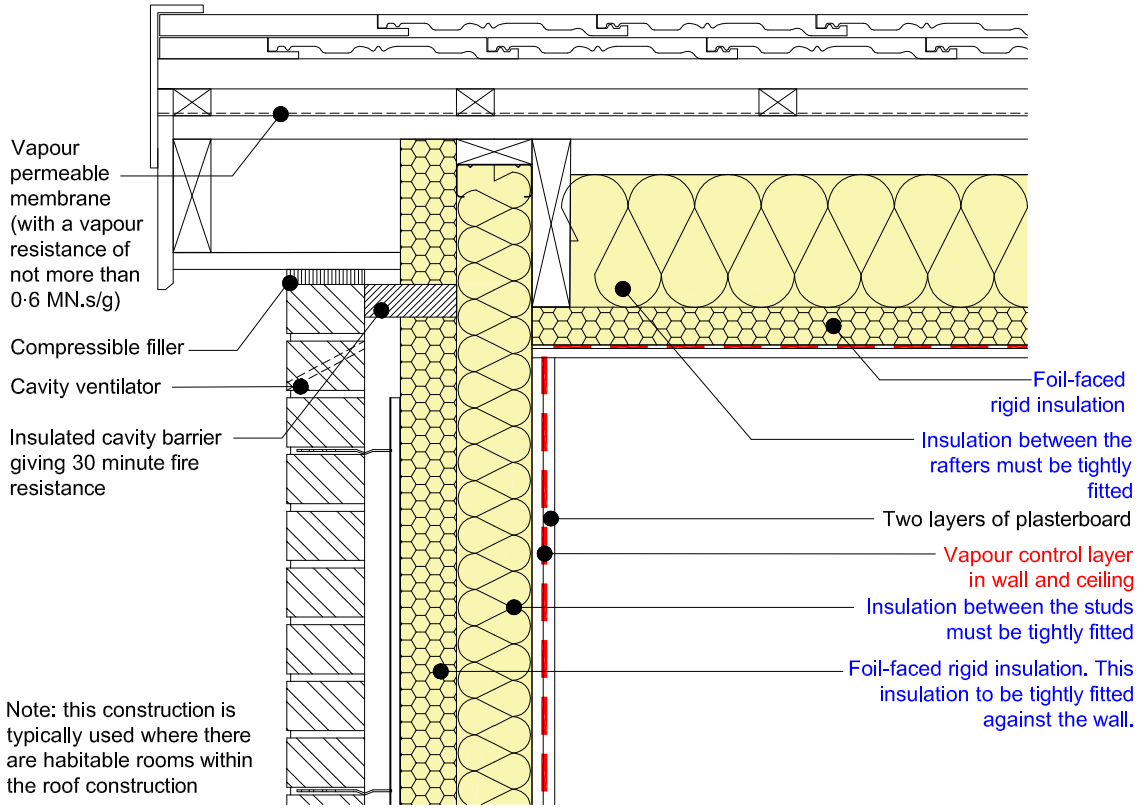
Detail 4.04 (E11)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



Note: this construction is typically used where there are habitable rooms within the roof construction

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W
Roof (between rafters)- 6·48 (m²K)/W
Roof (below rafters)- 2·27 (m²K)/W

Critical features

1. Ensure that roof insulation fully laps steel frame insulation.
2. Ensure that insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

1. Check ventilation paths are clear before installing insulation above the ceiling.
2. Install cavity barrier at the top of the wall.
3. Ventilation gap equivalent to 5 mm minimum continuous opening at ridge is required where the roof pitch is greater than 35° or the roof space is more than 10 m.

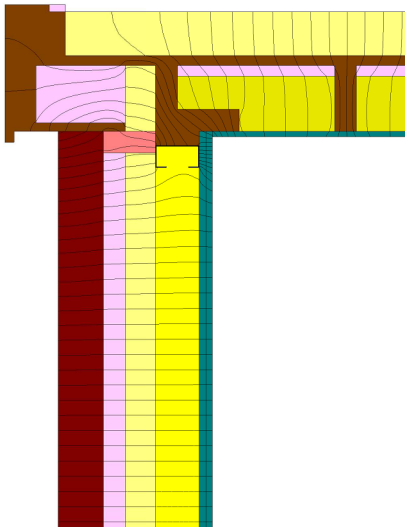
Ψ value = 0·078 W/m·K
Temp. factor = 0·84

Steel Frame: Steel Framing Sections

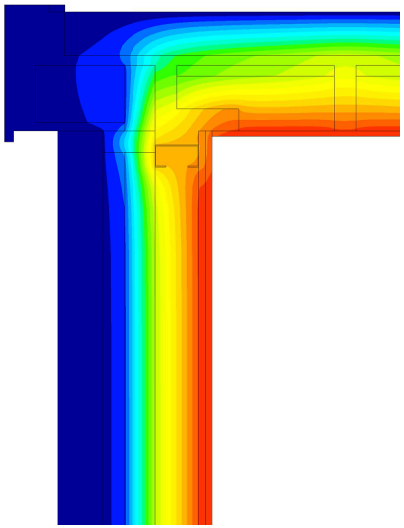
Pitched Roof: Ventilated Batten Void (warm roof) - Gable (Section view)

ACDs in support of 2015 energy standards

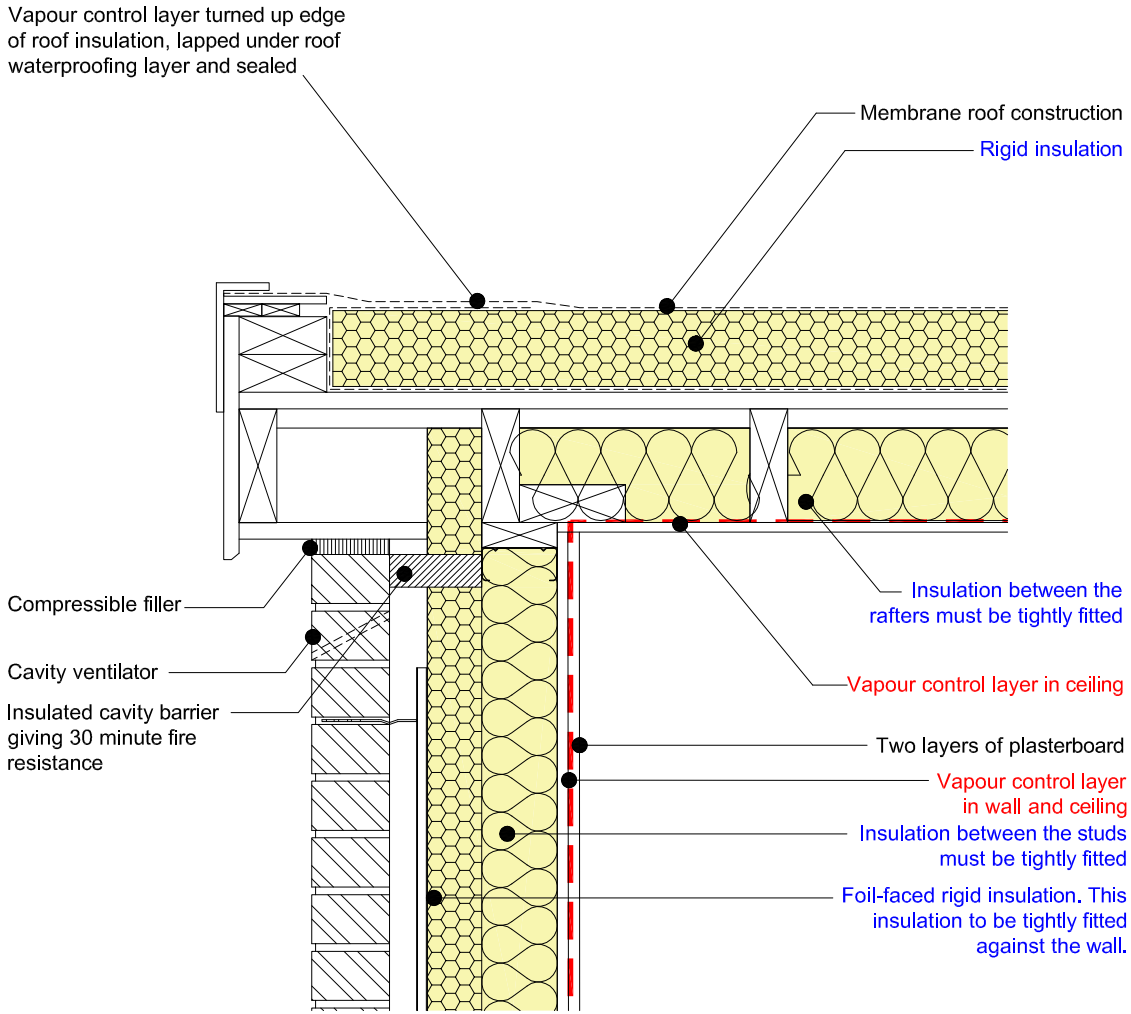
Detail 4.05 (E13)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W
Roof (above deck) - 4·55 (m²K)/W
Roof (between rafters) - 4·17 (m²K)/W

Critical features

1. Ensure that roof insulation fully laps steel frame insulation.
2. Ensure that insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

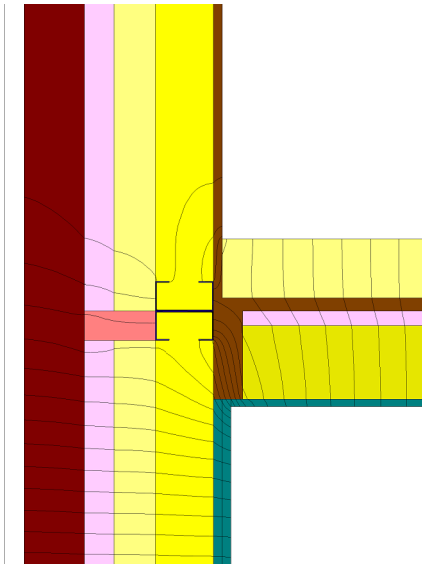
Additional advice

1. Check ventilation paths are clear before installing insulation above the ceiling.
2. A vapour barrier is required at ceiling level, to prevent moisture from entering into the roof construction.
3. The option here includes a vapour control layer and insulation as part of a membrane roof construction. Similar details could be used for a profiled decking roof but consult with manufacturer regarding ventilation requirements.
4. Install cavity barrier at the top of the wall.

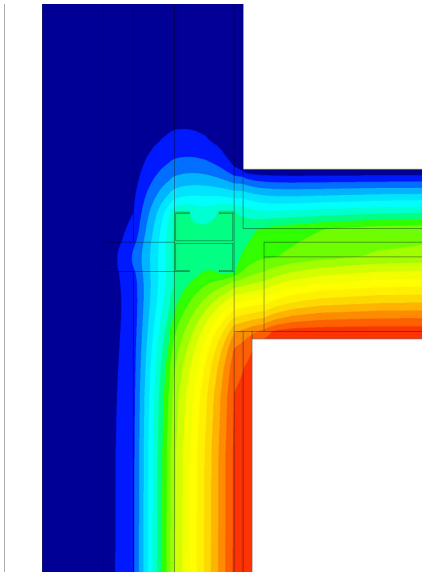
Ψ value = 0·062 W/m·K
Temp. factor = 0·93

Steel Frame: Steel Framing Sections
Timber Flat Roof (Section view)

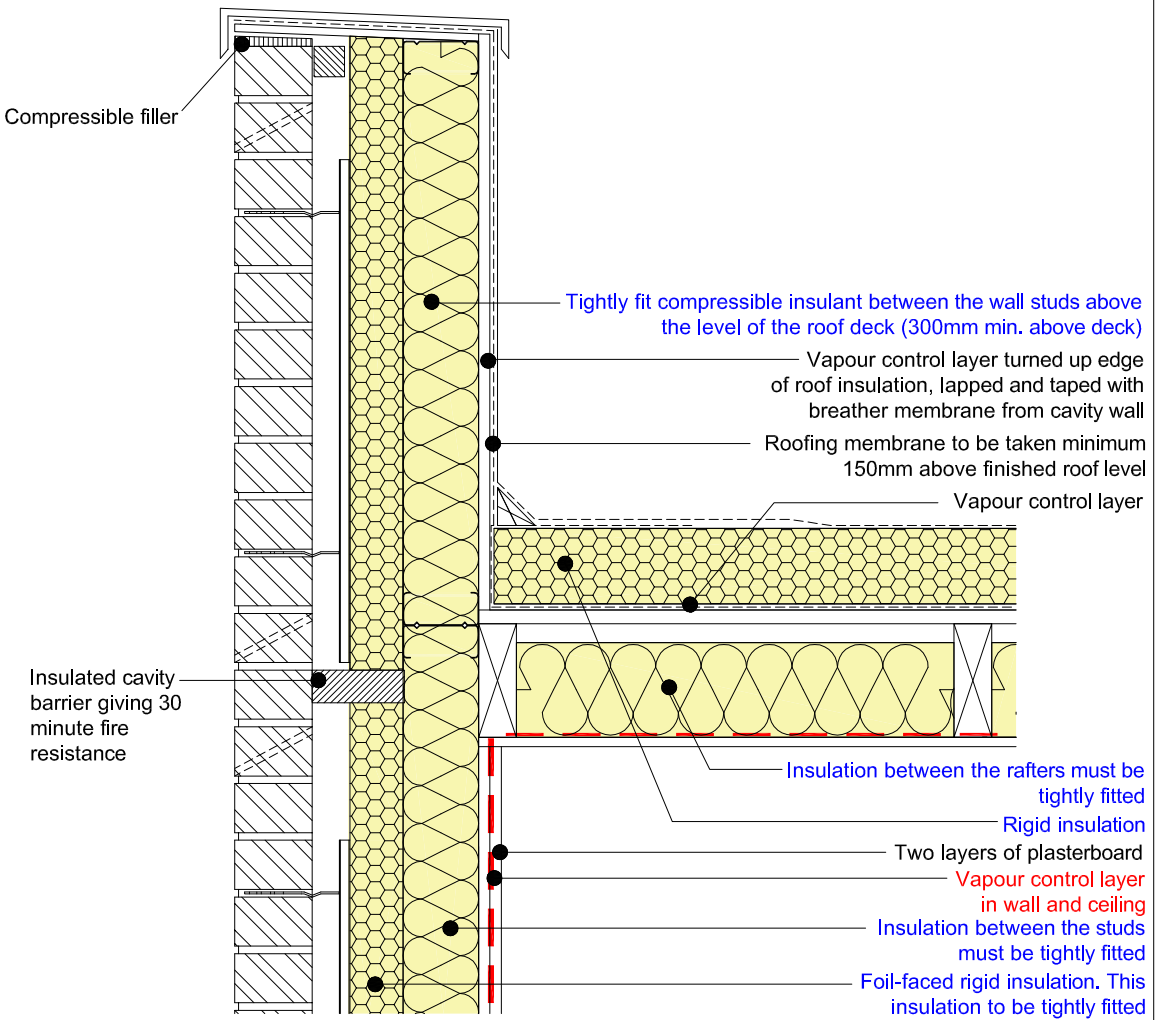
ACDs in support of 2015 energy standards
Detail 4.06 (E14)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

- Wall (cavity) - 3·18 (m²K)/W
- Wall (between studs) - 2·86 (m²K)/W
- Roof (above deck) - 4·55 (m²K)/W
- Roof (between rafters) - 4·17 (m²K)/W

Critical features

1. Ensure that roof insulation fully laps steel frame insulation.
2. Ensure that insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

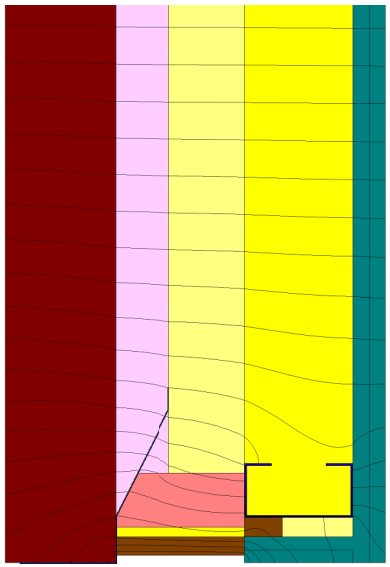
Additional advice

1. Check ventilation paths are clear before installing insulation above the ceiling.
2. Install cavity barrier at the top of the wall.
3. A vapour barrier is required at ceiling level to prevent moisture entering into the roof construction.
4. The option here includes a vapour control layer and insulation as part of a membrane roof construction. Similar details could be used for a profiled metal decking roof but consult with manufacturer regarding ventilation requirements.

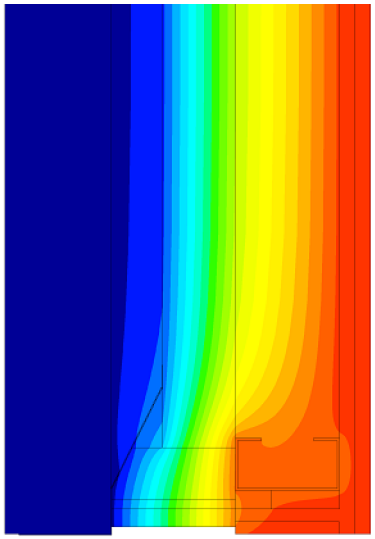
Ψ value = 0·090 W/m·K
Temp. factor = 0·83

Steel Frame: Steel Framing Sections
Timber Flat Roof with Parapet (Section view)

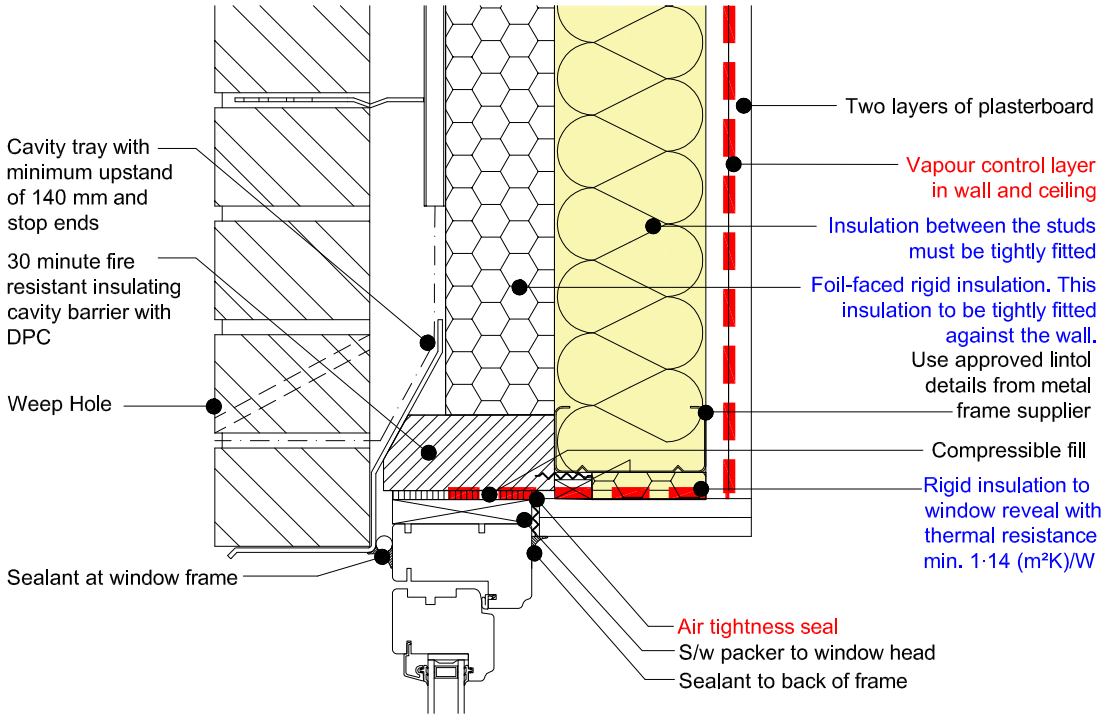
ACDs in support of 2015 energy standards
Detail 4.07 (E15)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W

Critical features

1. Install insulated cavity barrier around opening.
2. Ensure that insulation is tightly fitted.

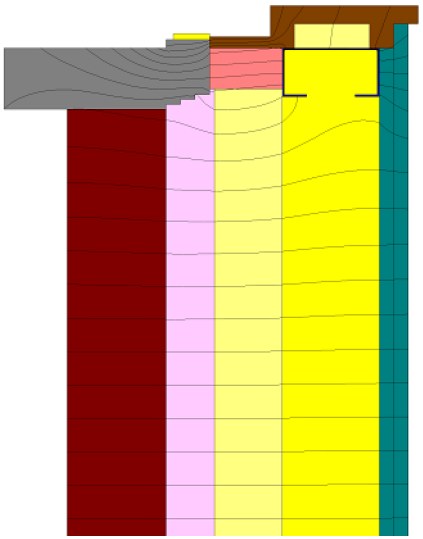
Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.
2. Install window to overlap with inner face of outer leaf.
3. Install air tightness tape between the outside face of the head of the window frame and the face of the structural finish of the window opening.

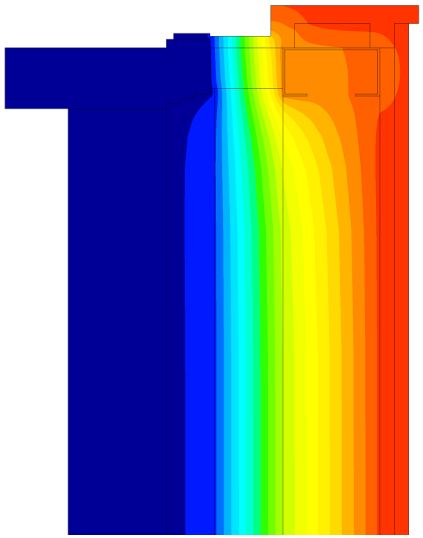
Ψ value = 0·025 W/m·K
Temp. factor = 0·94

Steel Frame: Steel Framing Sections
Lintel at Window Head (Section view)

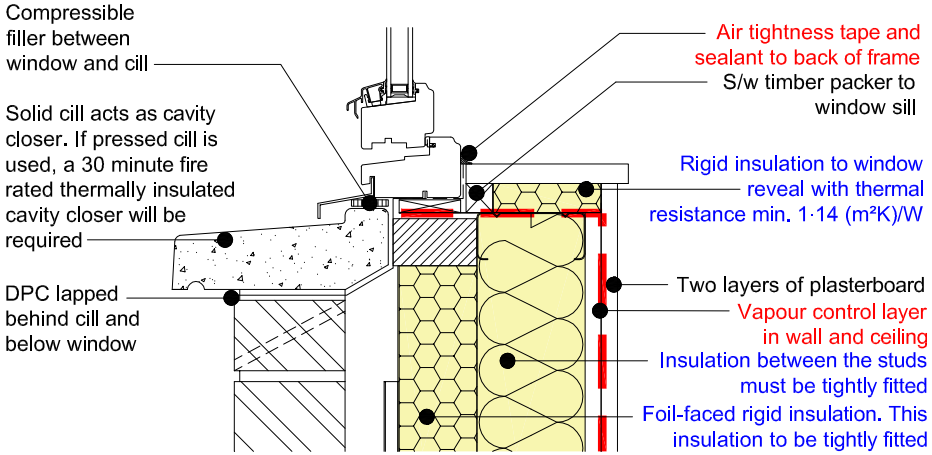
ACDs in support of 2015 energy standards
Detail 4.08a (E2)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W

Critical features

1. Install insulated cavity barrier around opening.
2. Ensure that insulation is tightly fitted.

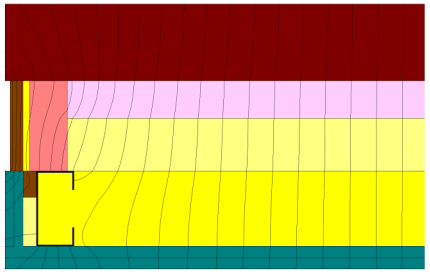
Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.
2. Install window to overlap with inner face of outer leaf.
3. Install air tightness tape between the outside face of the head of the window frame and the face of the structural finish of the window opening.

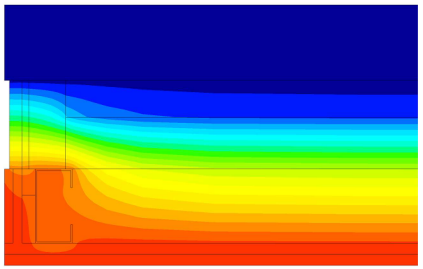
Ψ value = 0·025 W/m·K
Temp. factor = 0·95

Steel Frame: Steel Framing Sections
Window Cill (Section view)

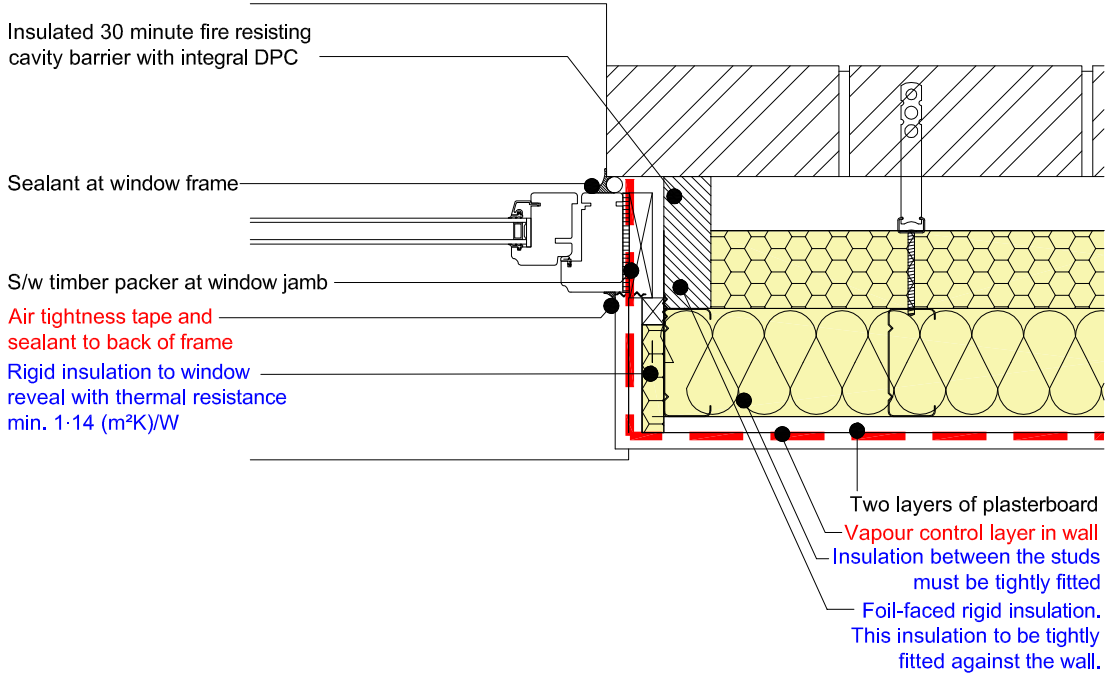
ACDs in support of 2015 energy standards
Detail 4.08b (E3)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W

Critical features

1. Install insulated cavity barrier around opening.
2. Ensure that insulation is tightly fitted.

Airtightness checklist

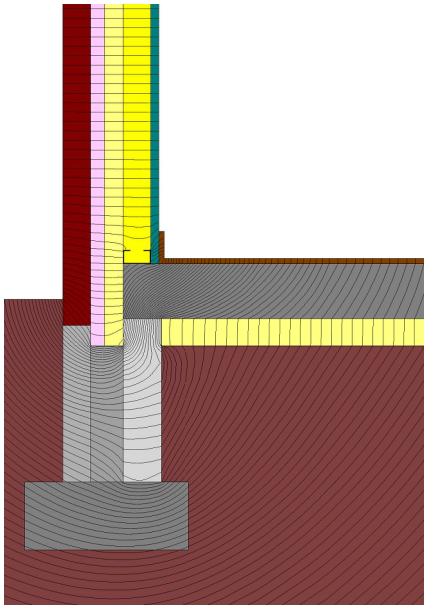
1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.
2. Install window to overlap with inner face of outer leaf.
3. Install air tightness tape between the outside face of the head of the window frame and the face of the structural finish of the window opening.

Ψ value = 0·024 W/m·K
Temp. factor = 0·93

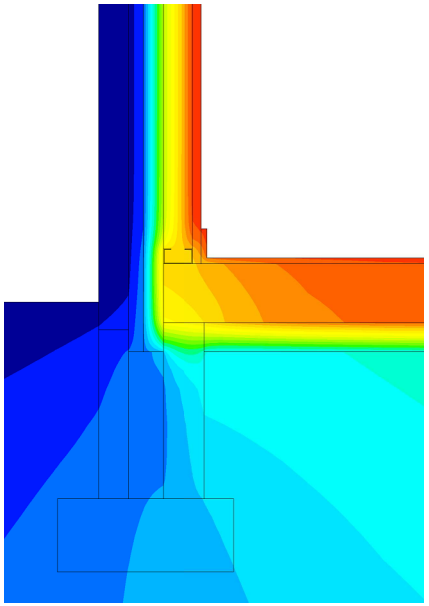
Steel Frame: Steel Framing Sections
Windows and Doors - Jamb (Plan view)

ACDs in support of 2015 energy standards

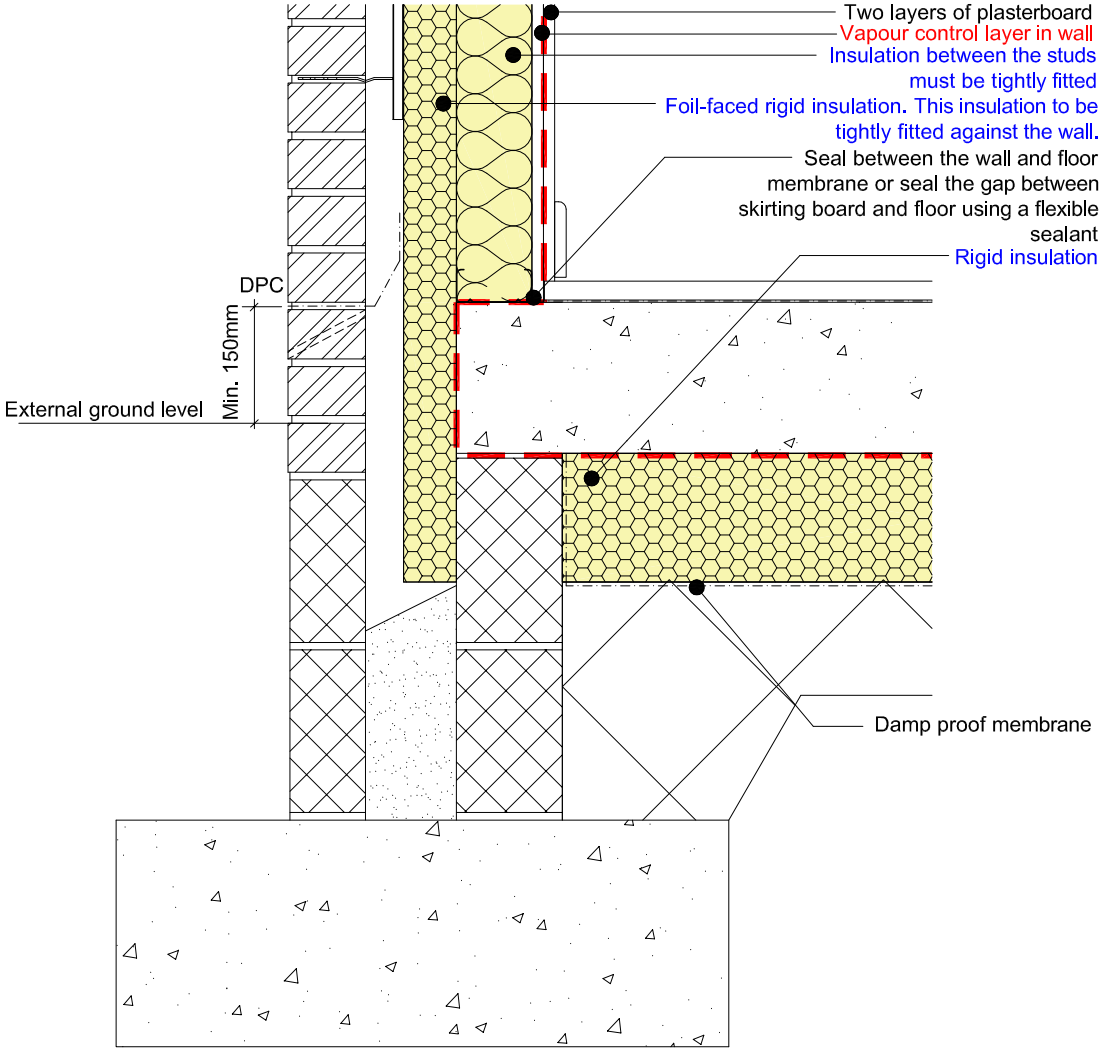
Detail 4.08c (E4)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity)- 3·18 (m²K)/W
Wall (inner leaf) - 2·86 (m²K)/W
Floor - 4·55 (m²K)/W

Critical features

1. Use a lightweight loadbearing concrete block where the wall abuts the concrete slab to minimise thermal bridging.
2. Ensure that insulation is tightly fitted.
3. Ensure that insulation level in external wall overlaps with the insulation at the floor slab.

Airtightness checklist

1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.

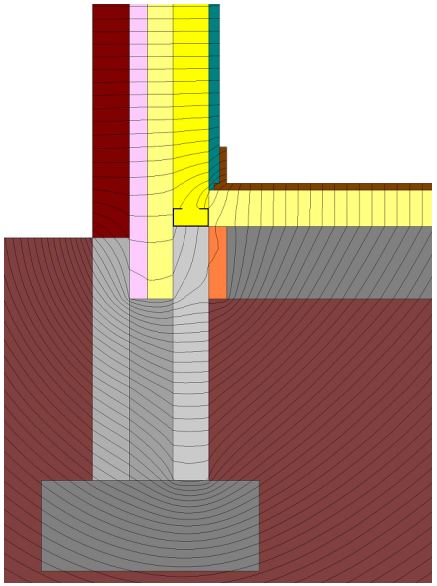
Ψ value = 0·137 W/m·K
Temp. factor = 0·90

Steel Frame: Steel Framing Sections

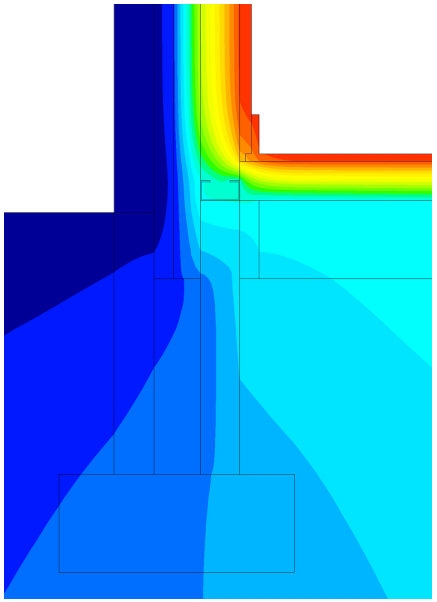
Suspended ground floor slab: Insulation Below Slab (Section view)

ACDs in support of 2015 energy standards

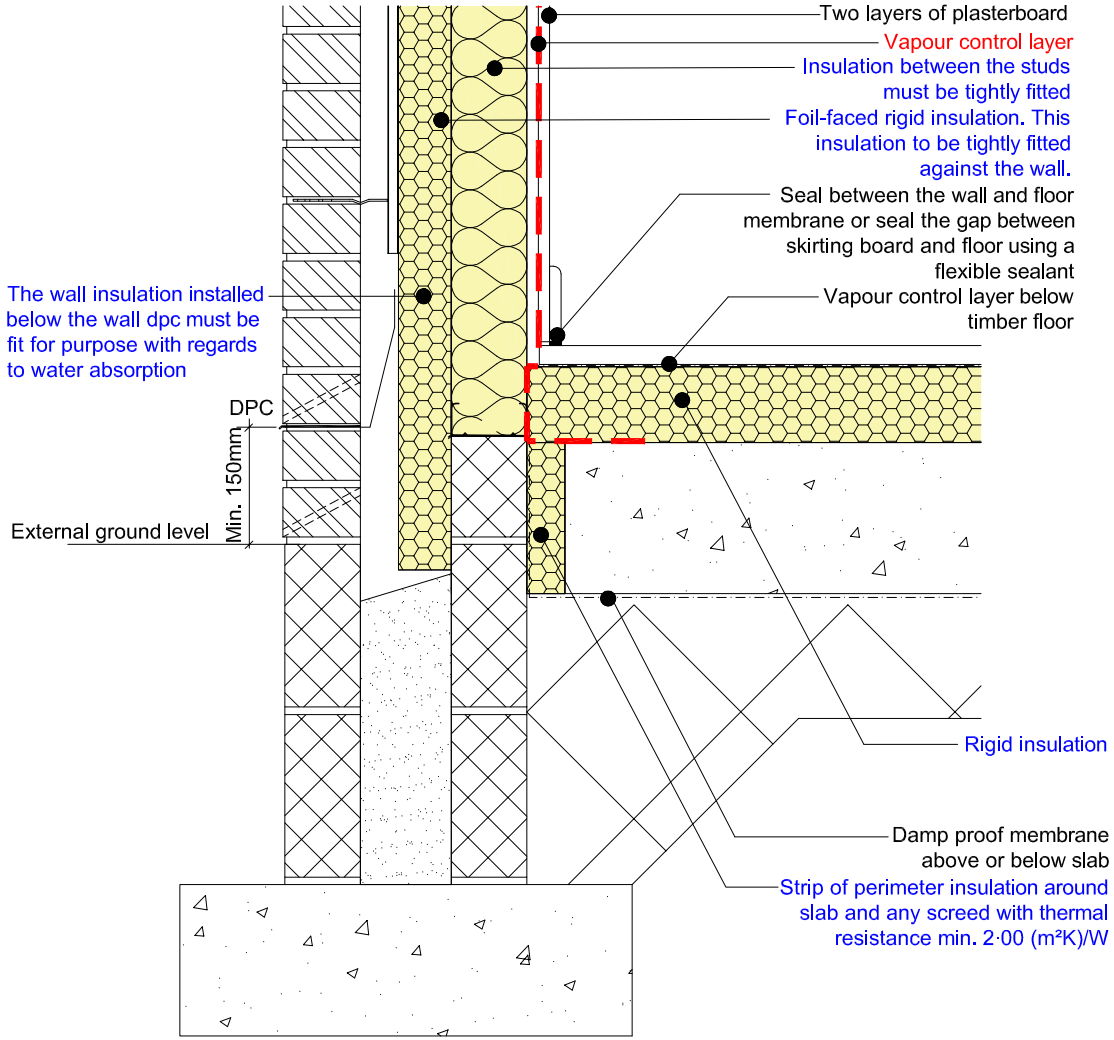
Detail 4.09 (E5)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W
Floor - 4·55 (m²K)/W

Critical features

1. Use a lightweight loadbearing concrete block where the wall abuts the concrete slab to minimise thermal bridging.
2. Use a perimeter strip of insulation where the concrete slab abuts the concrete blockwork wall.
3. Ensure that insulation is tightly fitted.
4. Ensure that insulation level in external wall overlaps with the insulation at the floor slab.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

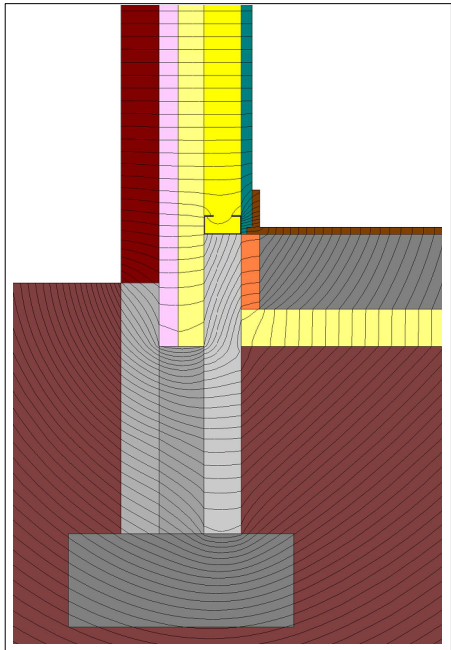
Additional advice

1. Check that concrete slab is level and clear of debris before fitting the insulation at floor level.

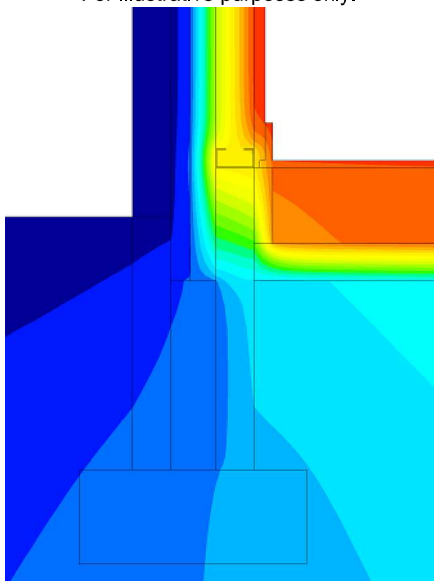
Ψ value = 0·055 W/m·K
Temp. factor = 0·88

Steel Frame: Steel Framing Sections
Ground Bearing Floor: Insulation Above Slab (Section view)

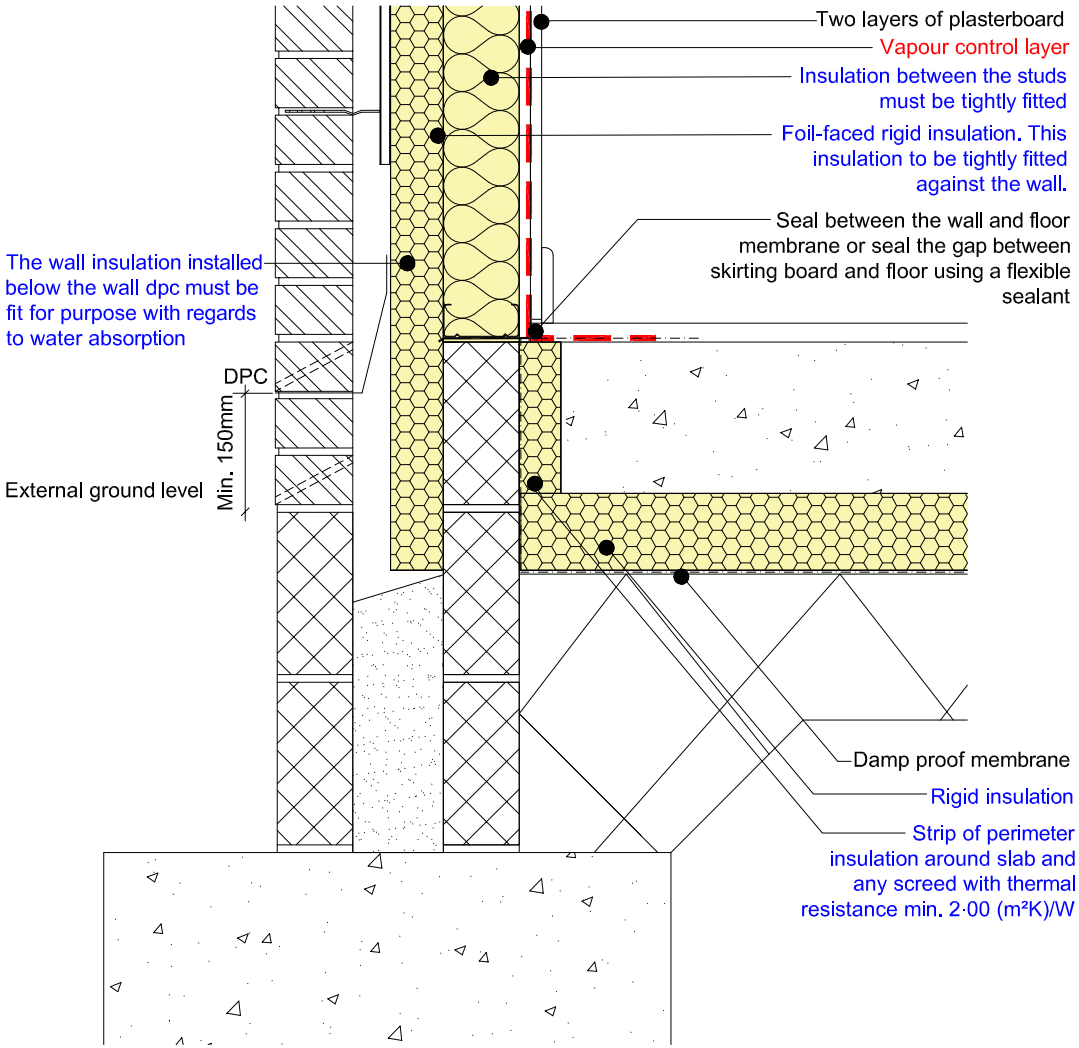
ACDs in support of 2015 energy standards
Detail 4.10 (E5)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W
Floor - 4·55 (m²K)/W

Critical features

1. Use a lightweight loadbearing concrete block where the wall abuts the concrete slab to minimise thermal bridging.
2. Use a perimeter strip of insulation where the concrete slab abuts the concrete blockwork wall.
3. Ensure that insulation is tightly fitted.
4. Ensure that insulation level in external wall overlaps with the insulation at the floor slab.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

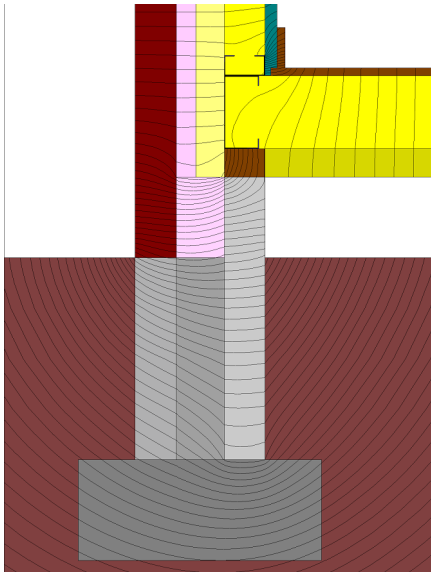
Additional advice

1. Check that concrete slab is level and clear of debris before fitting the insulation at floor level.

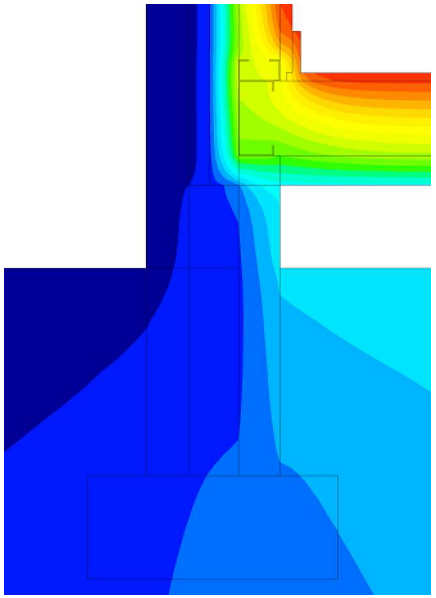
Ψ value = 0·073 W/m·K
Temp. factor = 0·93

Steel Frame: Steel Framing Sections
Ground Bearing Floor: Insulation Below Slab (Section view)

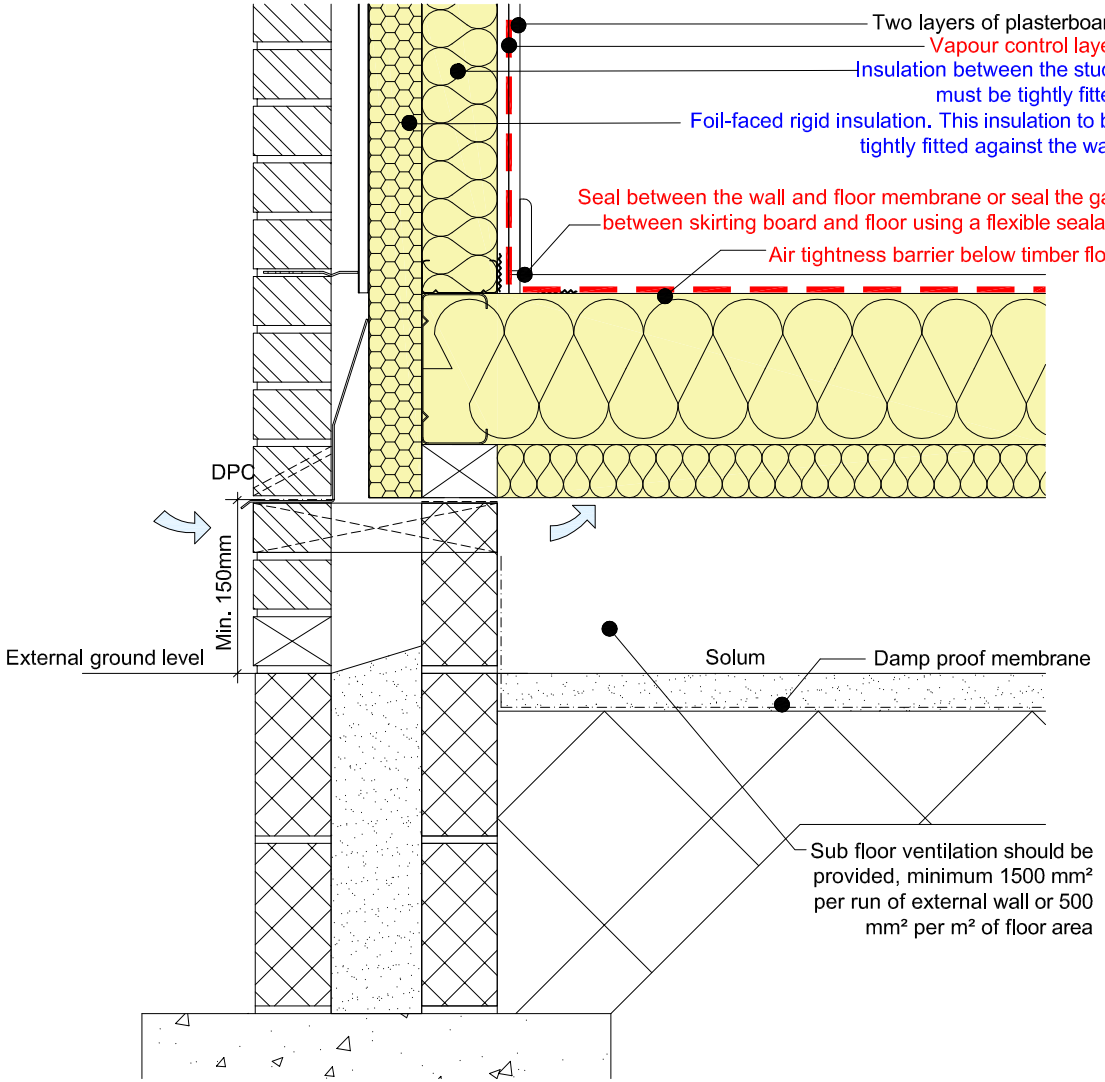
ACDs in support of 2015 energy standards
Detail 4.11 (E5)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

- Wall (cavity) - 3·18 (m²K)/W
- Wall (between studs - 2·86 (m²K)/W
- Floor (between joists) - 4·00 (m²K)/W
- Floor (below joists) - 2·33 (m²K)/W

Critical features

1. Ensure that insulation is tightly fitted.
2. Ensure that insulation level in external wall overlaps with the insulation at the floor construction.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

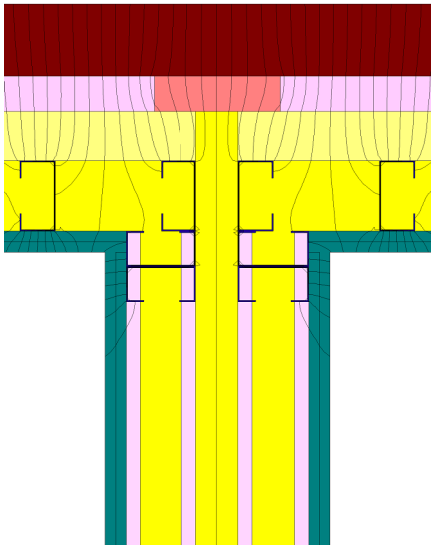
Additional advice

1. Check that all ventilation paths are clear before installing the floor insulation.

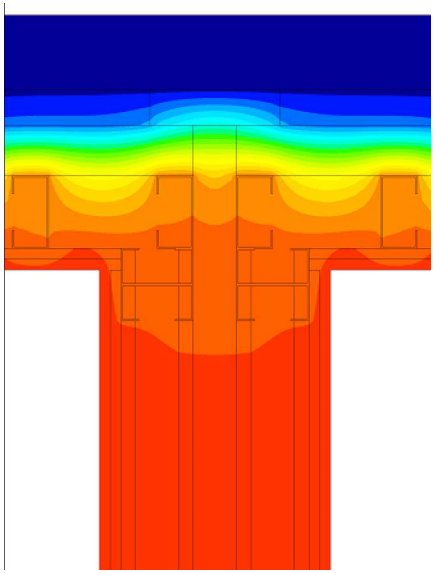
Ψ value = 0·077 W/m·K
Temp. factor = 0·89

Steel Frame: Steel Framing Sections
Steel Suspended Ground Floor (Section view)

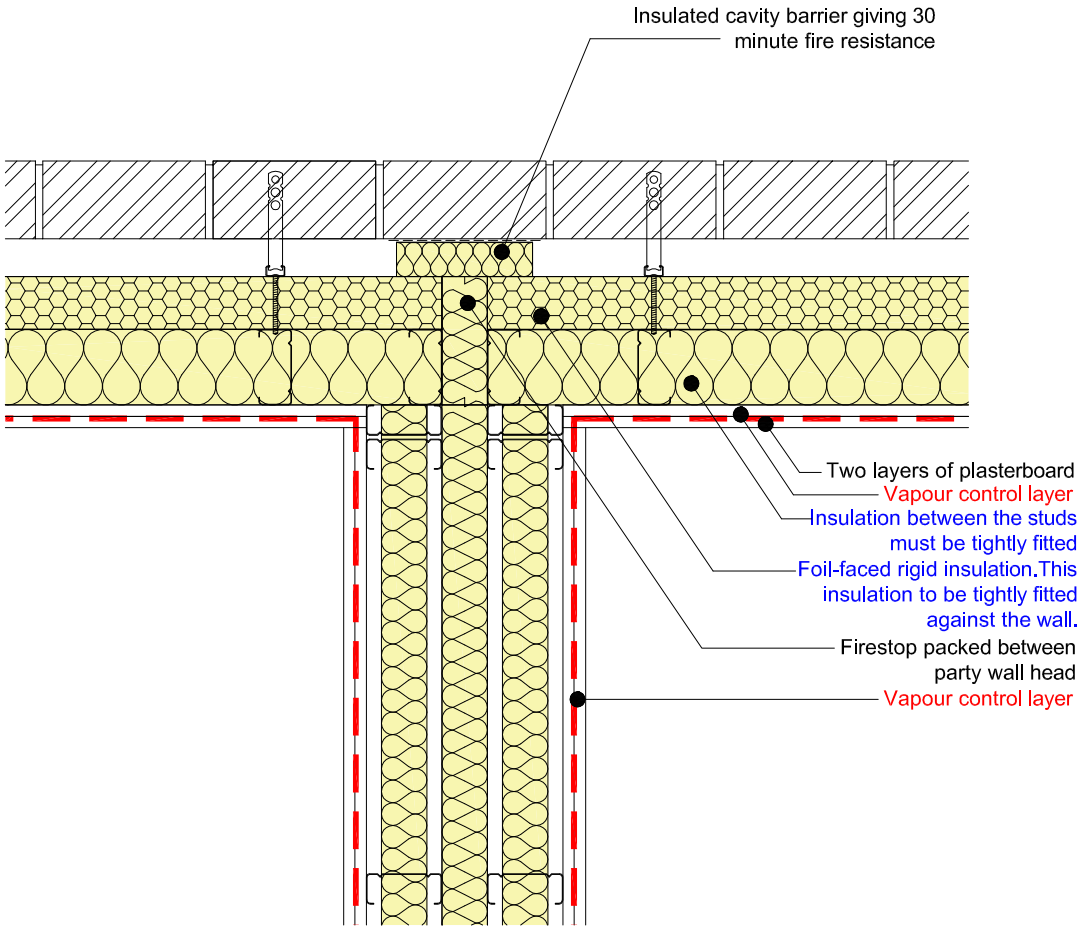
ACDs in support of 2015 energy standards
Detail 4.12 (E5)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:
Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W

Critical features

1. Check that there is no debris in cavity.
2. Ensure insulation is tightly fitted.
3. Install thermally insulated cavity barrier in line with separating wall.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

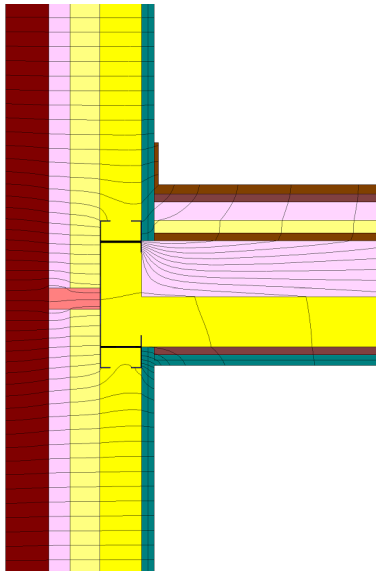
Additional advice

1. Check that insulation is fitted tightly to steel studs at corner junctions.
2. Cavity wall insulation to be secured to one side of wall only to minimise noise transmission.

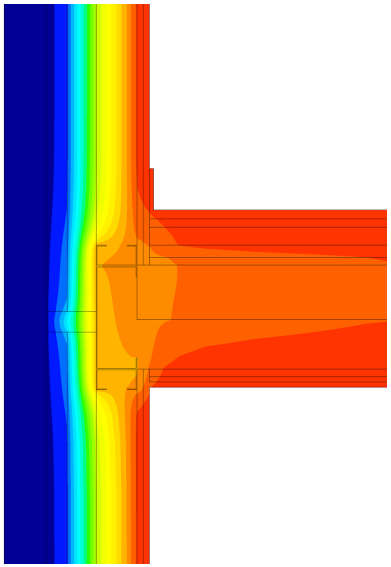
Ψ value = 0·087 W/m·K
Temp. factor = 0·96

Steel Frame: Steel Framing Sections
Separating Wall (Plan view)

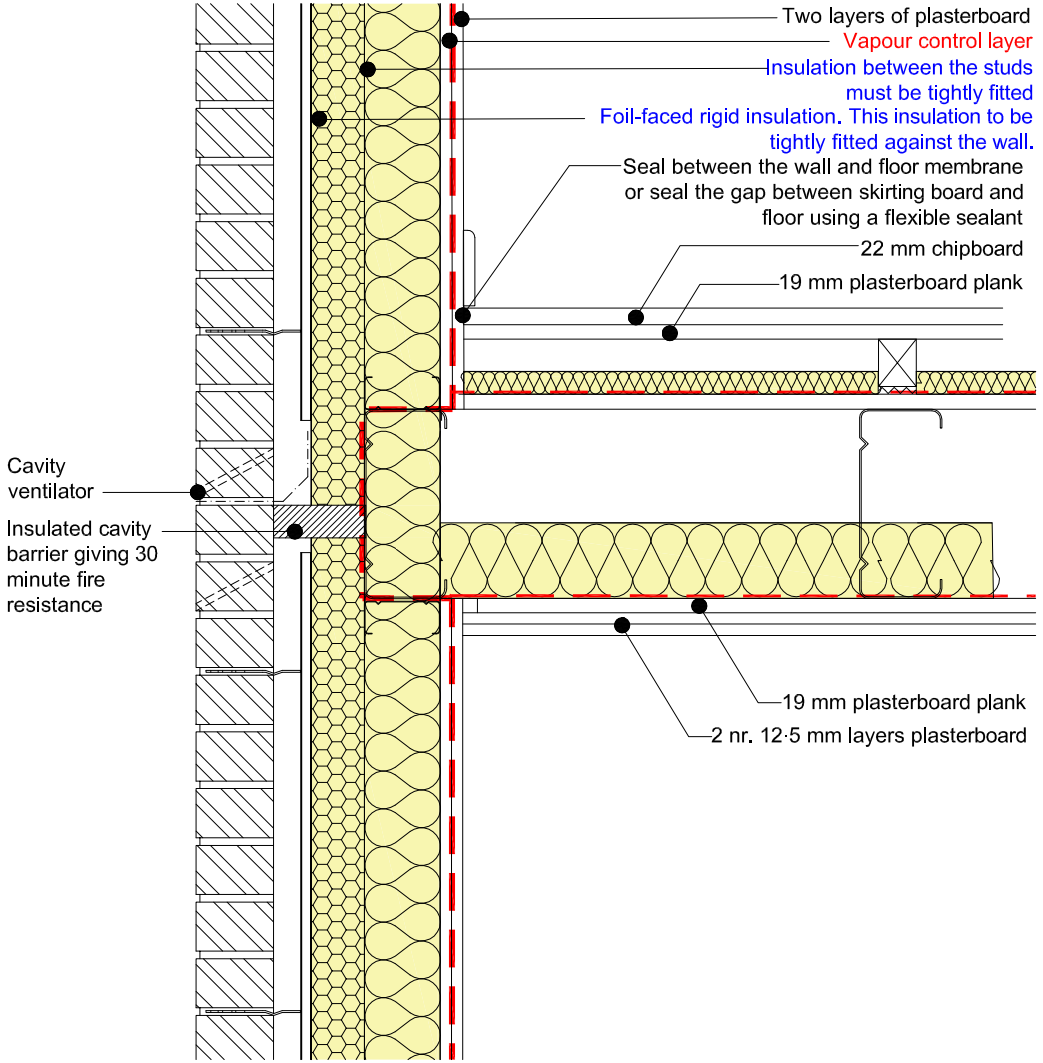
ACDs in support of 2015 energy standards
Detail 4.13 (E18)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W

Critical features

1. Check that there is no debris in cavity.
2. Ensure insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

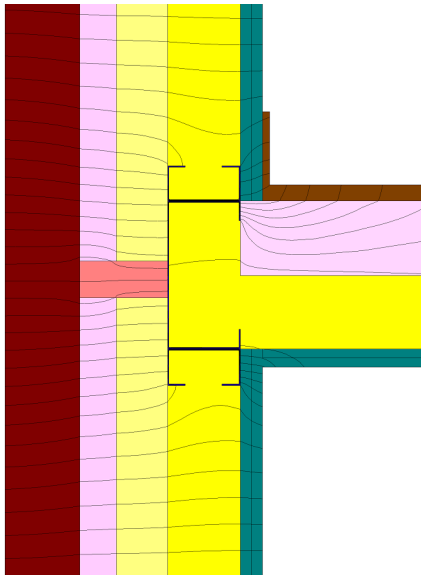
Additional advice

1. Check that insulation is tightly fixed to the steel studs adjacent to the floor junction, leaving no gaps.

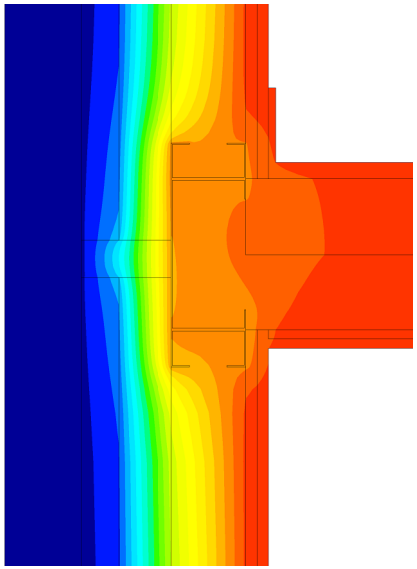
Ψ value = 0·098 W/m·K
Temp. factor = 0·94

Steel Frame: Steel Framing Sections
Timber Separating Floor (Section view)

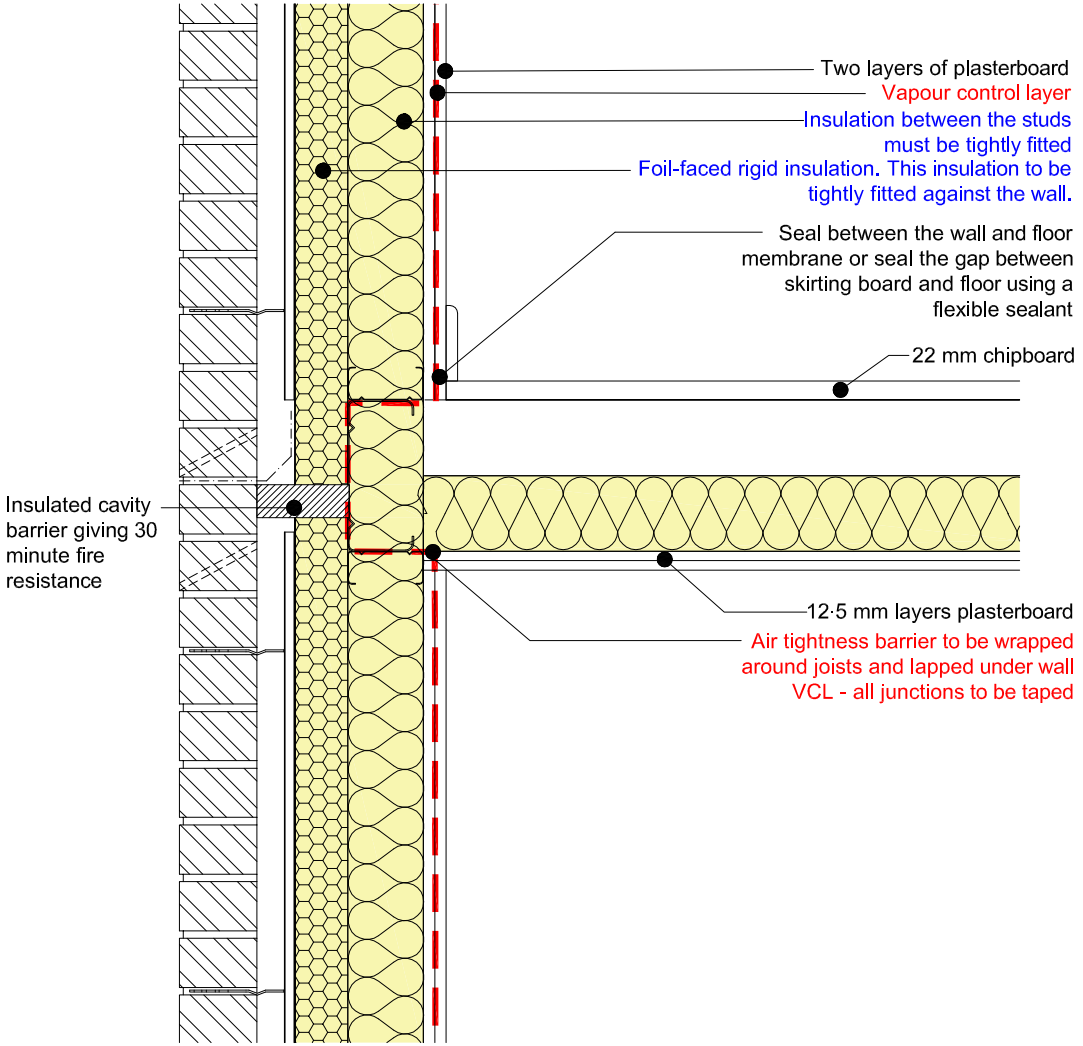
ACDs in support of 2015 energy standards
Detail 4.14 (E7)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W

Critical features

1. Check that there is no debris in cavity.
2. Ensure insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

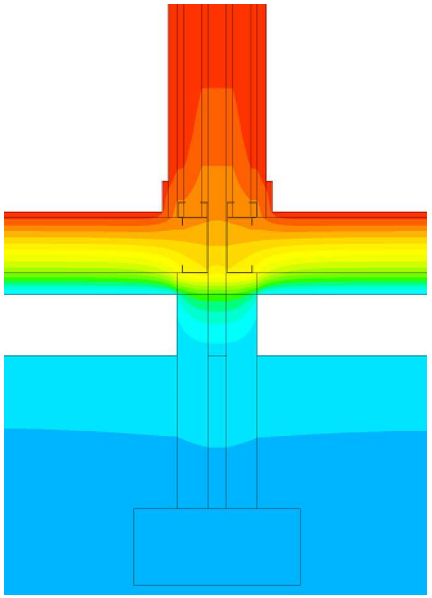
1. Check that insulation is tightly fixed to the steel studs adjacent to the floor junction, leaving no gaps.

Ψ value = 0·025 W/m·K
Temp. factor = 0·95

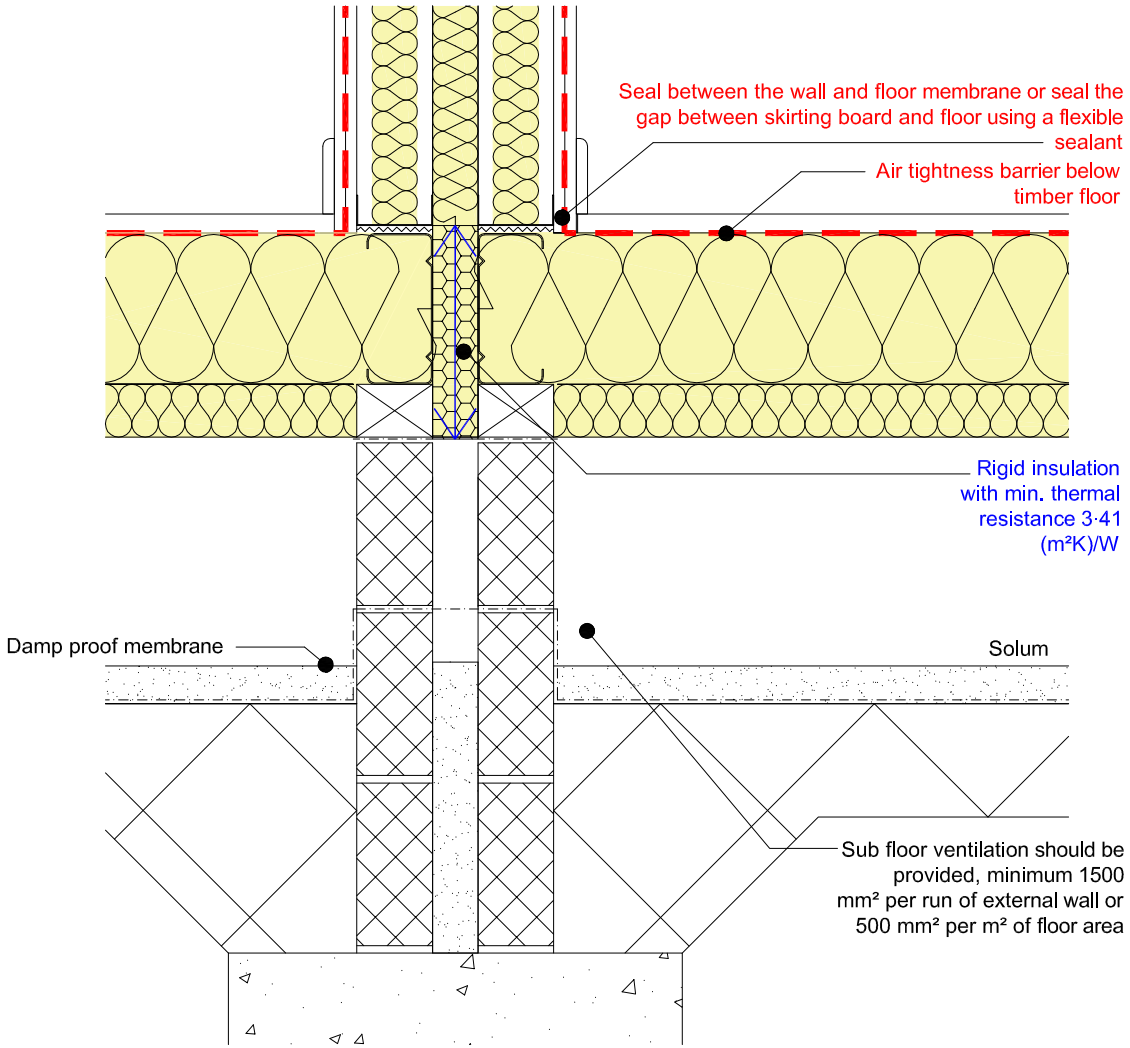
Steel Frame: Steel Framing Sections
Timber Intermediate Floor (Section view)

ACDs in support of 2015 energy standards
Detail 4.15 (E6)

Heat Flow Distribution diagram
not available



Temperature Distribution diagram
For illustrative purposes only.



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Floor (between joists) - 4·00 (m²K)/W
Floor (below joists) - 2·33 (m²K)/W

Critical features

1. Ensure that insulation is tightly fitted between the steel floor joists.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

1. Check that all ventilation paths are clear before installing the floor insulation.
2. Cavity wall insulation to be secured to one side of wall only to minimise noise transmission.

Ψ value = 0·063 W/m·K
Temp. factor = 0·96

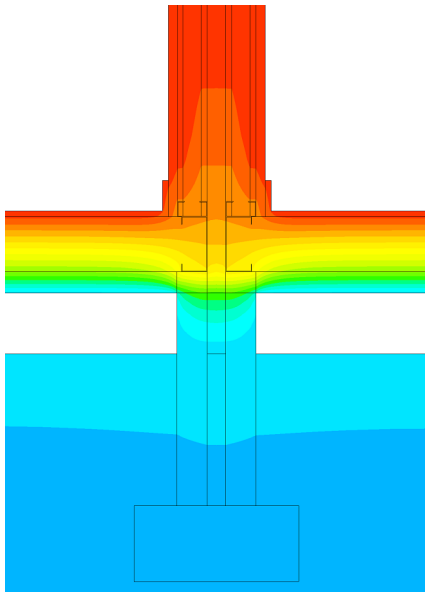
Steel Frame: Steel Framing Section

Ground Floor / Separating Wall junction-steel suspended floor (Section view)

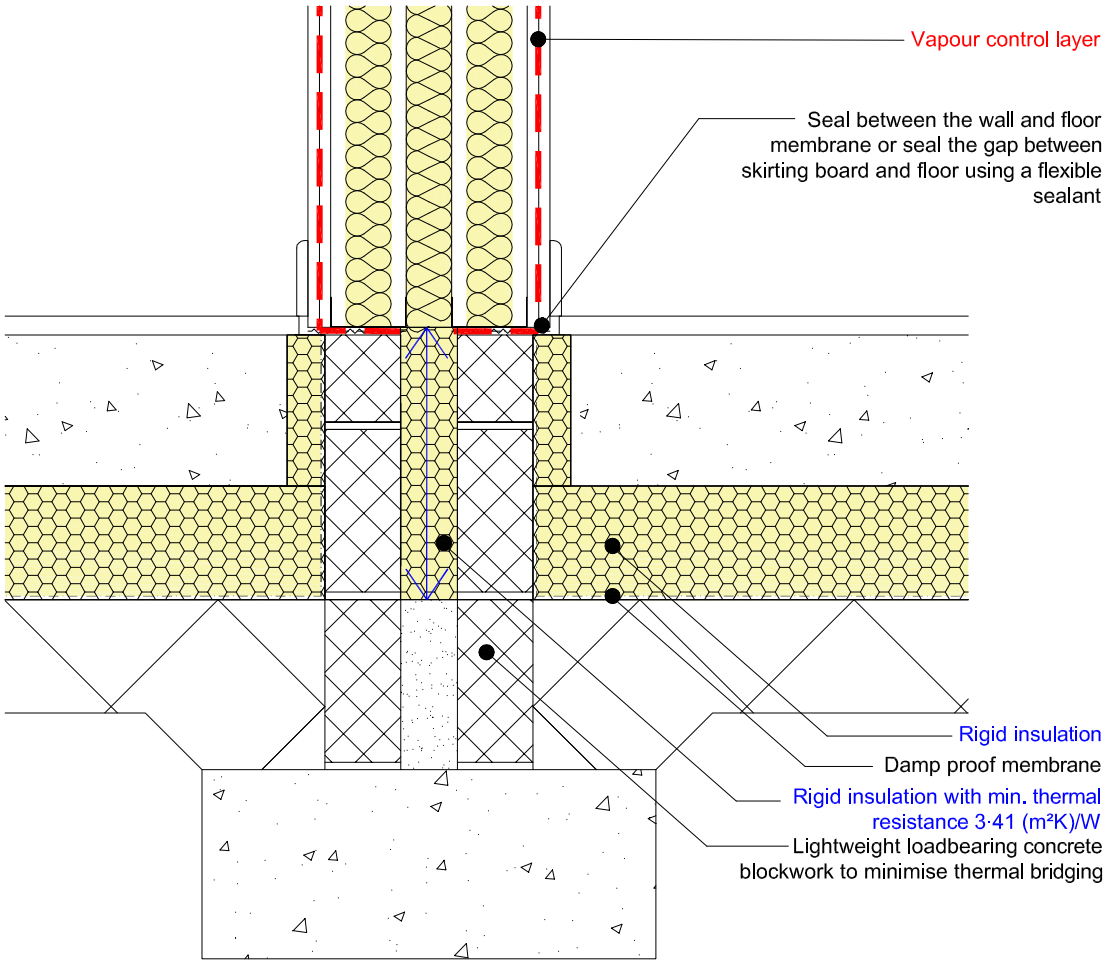
ACDs in support of 2015 energy standards

Detail 4.16 (P1)

Heat Flow Distribution diagram
not available



Temperature Distribution diagram
For illustrative purposes only.



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Floor - 4·55 (m²K)/W

Critical features

1. Use a lightweight loadbearing concrete block where the wall abuts the concrete slab to minimise thermal bridging.
2. Ensure insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

1. Cavity wall insulation to be secured to one side of wall only to minimise noise transmission.

Ψ value = 0·083 W/m·K
Temp. factor = 0·97

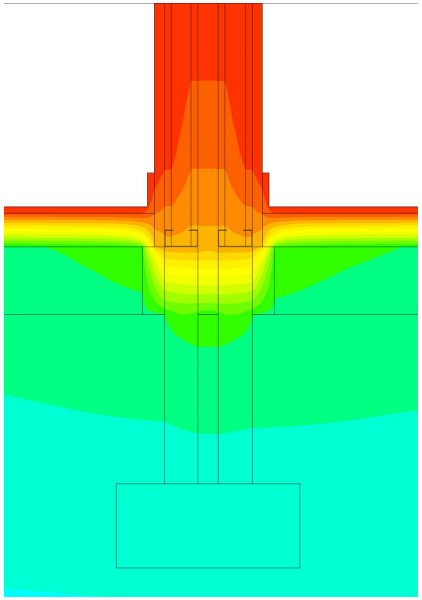
Steel Frame: Steel Framing Sections

Concrete Ground Floor/ Separating Wall: Insulation Below Slab (Section view)

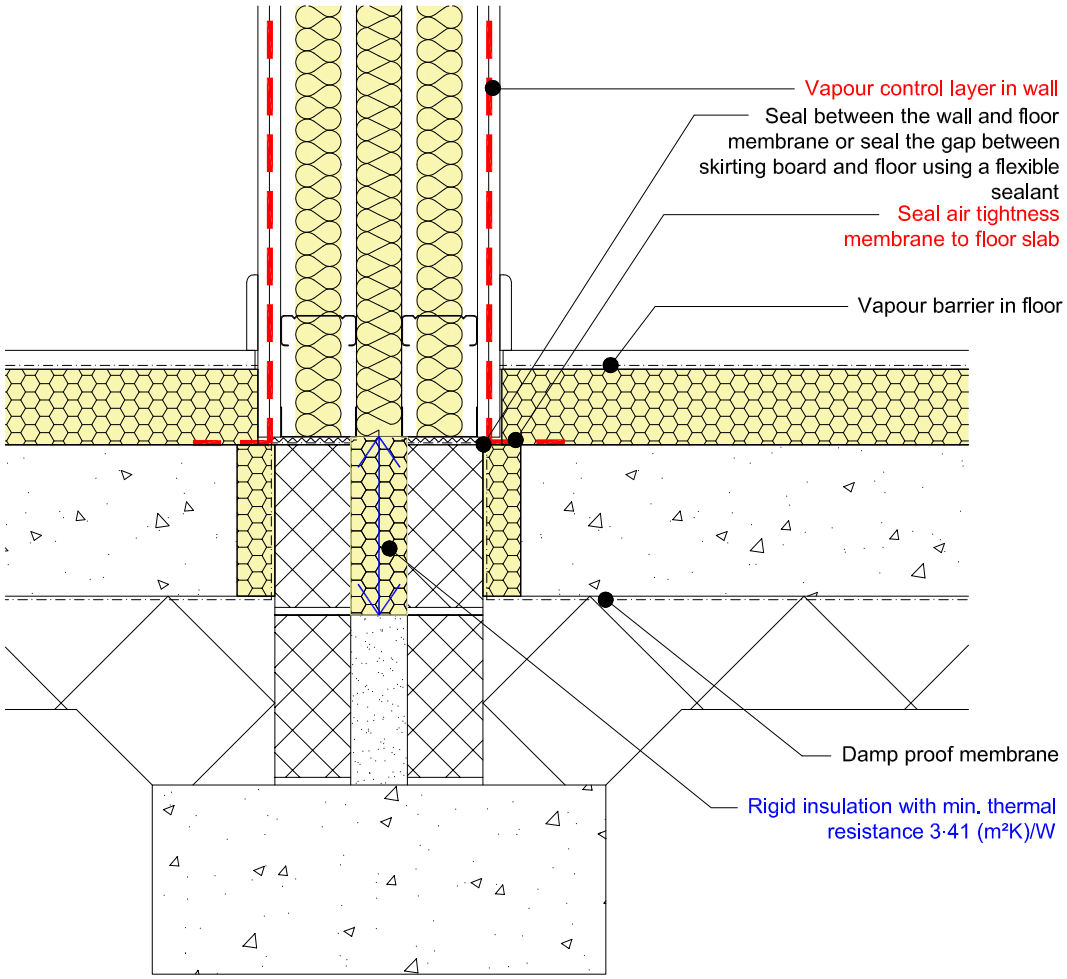
ACDs in support of 2015 energy standards

Detail 4.17 (P1)

Heat Flow Distribution diagram
not available



Temperature Distribution diagram
For illustrative purposes only.



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Floor - 4·55 (m²K)/W

Critical features

1. Use a lightweight loadbearing concrete block where the wall abuts the concrete slab to minimise thermal bridging.
2. Ensure insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

1. Check that concrete slab is level and clear of debris before fitting the insulation at floor level.
2. Cavity wall insulation to be secured to one side of wall only to minimise noise transmission.

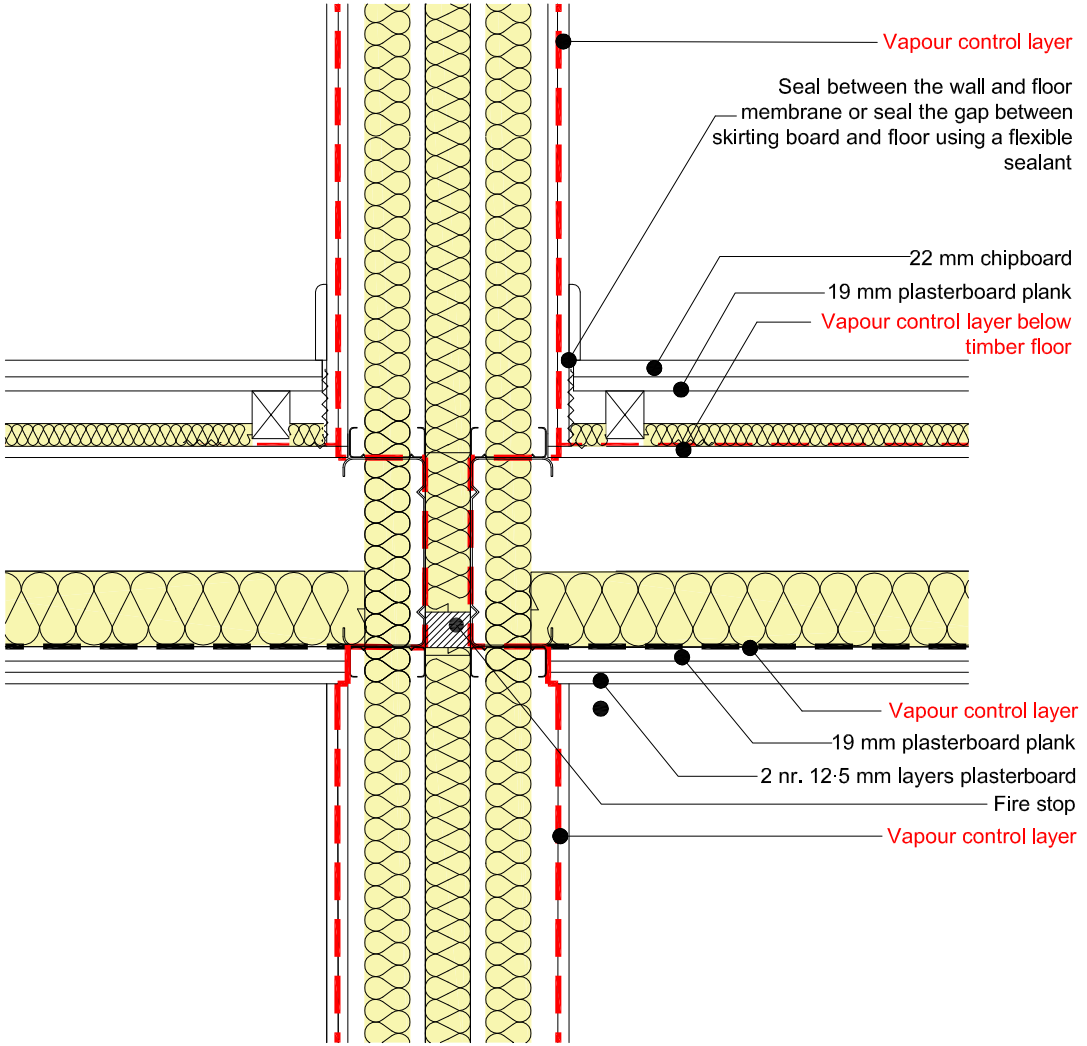
Ψ value = 0·072 W/m·K
Temp. factor = 0·95

Steel Frame: Steel Framing Sections

Concrete Ground Floor/ Separating Wall: Insulation Above Slab (Section view)

ACDs in support of 2015 energy standards

Detail 4.18 (P1)



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Critical features

1. Check that there is no debris in cavity.
2. Ensure insulation is tightly fitted.

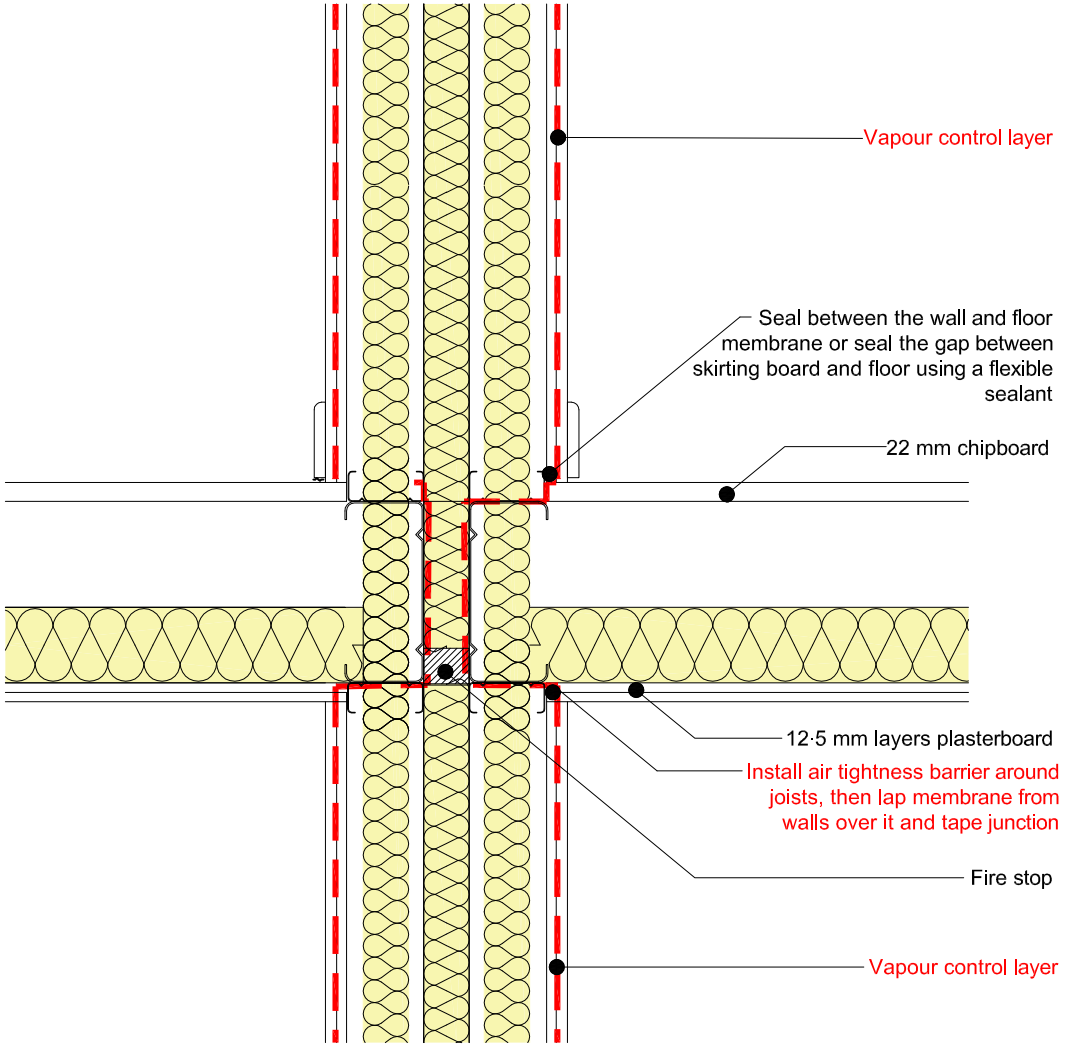
Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Ψ value not applicable

Steel Frame: Steel Framing Sections

Timber Separating Floor / Separating Wall junction (Section view)



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Critical features

1. Check that there is no debris in cavity.
2. Ensure insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

1. Check that insulation is tightly fixed to the steel studs adjacent to the floor junction, leaving no gaps.
2. Cavity wall insulation to be secured to one side of wall only to minimise noise transmission.

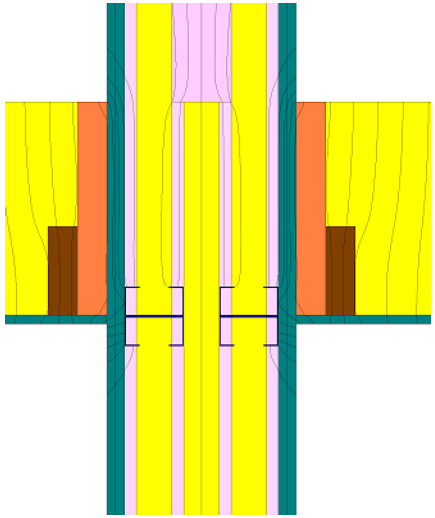
Ψ value not applicable

Steel Frame: Steel Framing Sections

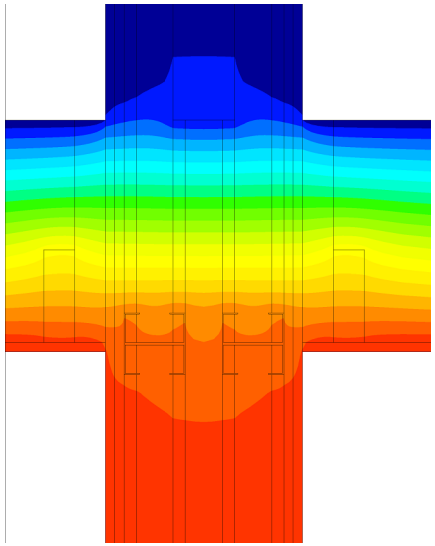
Timber Intermediate Floor / Separating Wall junction (Section view)

ACDs in support of 2015 energy standards

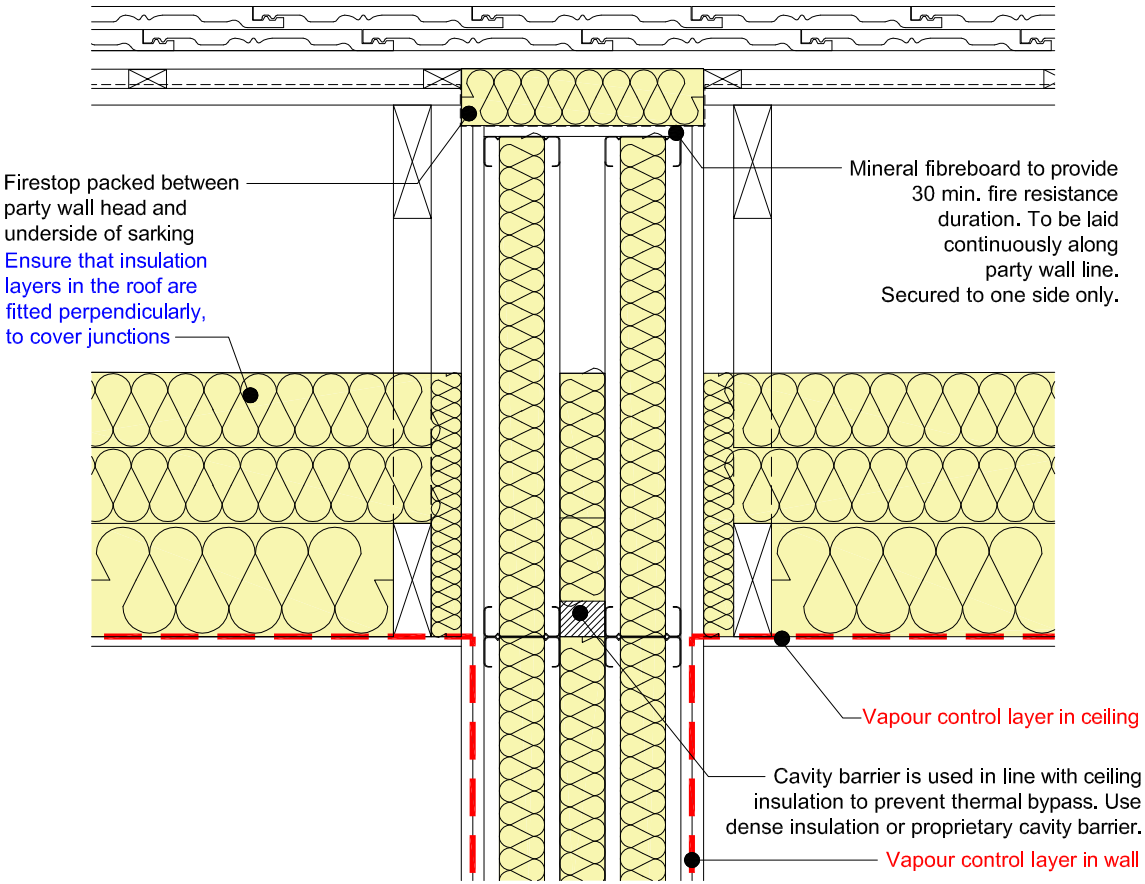
Detail 4.20 (P2)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Roof - 9·00 (m²K)/W

Critical features

1. Install a cavity barrier at the top of the wall.
2. Ensure that insulation layers in roof are fitted perpendicularly, to cover junctions.
3. Ensure insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

1. Check ventilation paths at eaves are clear before installing insulation above the ceiling.
2. Cavity wall insulation to be secured to one side of wall only to minimise noise transmission.

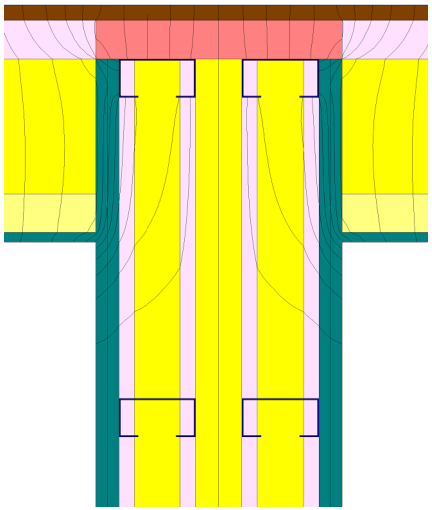
Ψ value = 0·196 W/m·K
Temp. factor = 0·91

Steel Frame: Steel Framing Sections

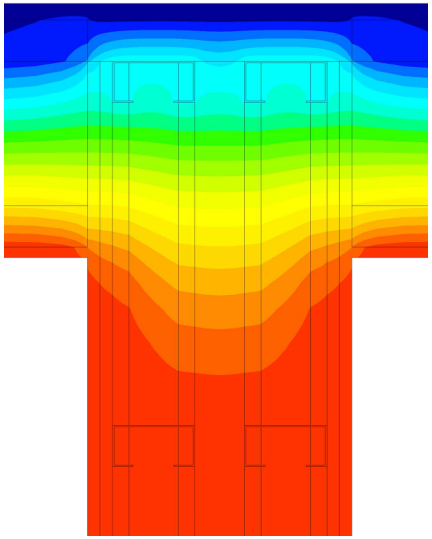
Pitched Roof: Cold Roof / Separating Wall junction (Section view)

ACDs in support of 2015 energy standards

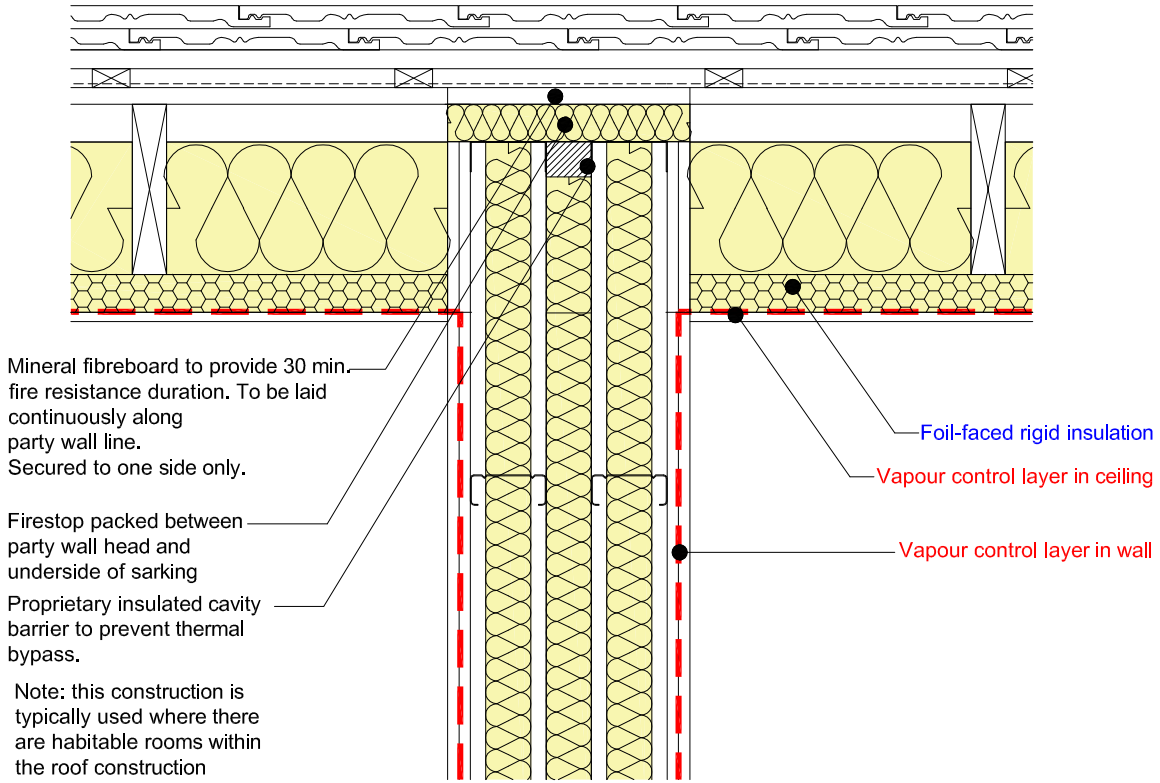
Detail 4.21 (P4)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



Note: this construction is typically used where there are habitable rooms within the roof construction

For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Roof (between rafters) - 6·48 (m²K)/W
Roof (below rafters)- 2·27 (m²K)/W

Critical features

1. Install cavity barrier at the top of the wall.
2. Ensure insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

1. Check ventilation paths at eaves are clear before installing insulation above the ceiling.
2. Cavity wall insulation to be secured to one side of wall only to minimise noise transmission.

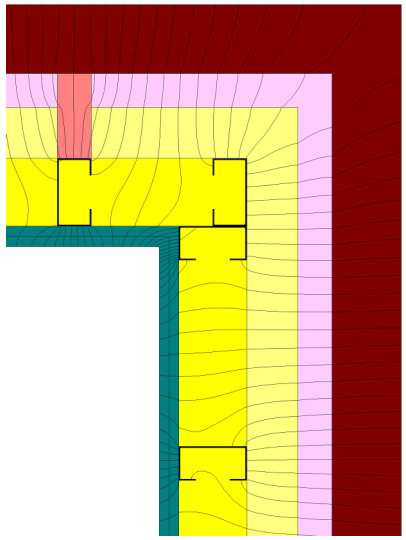
Ψ value = 0·147 W/m·K
Temp. factor = 0·89

Steel Frame: Steel Framing Sections

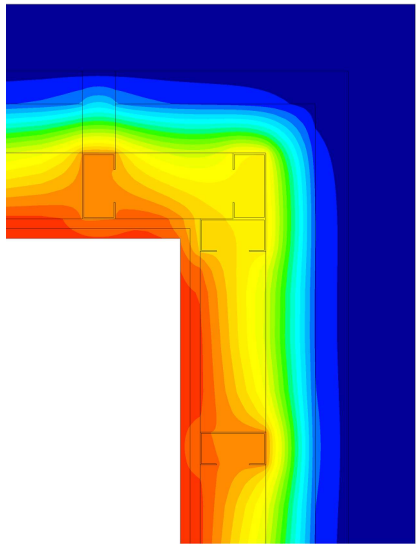
Pitched Roof: Ventilated Batten Void/ Separating Wall junction (Section view)

ACDs in support of 2015 energy standards

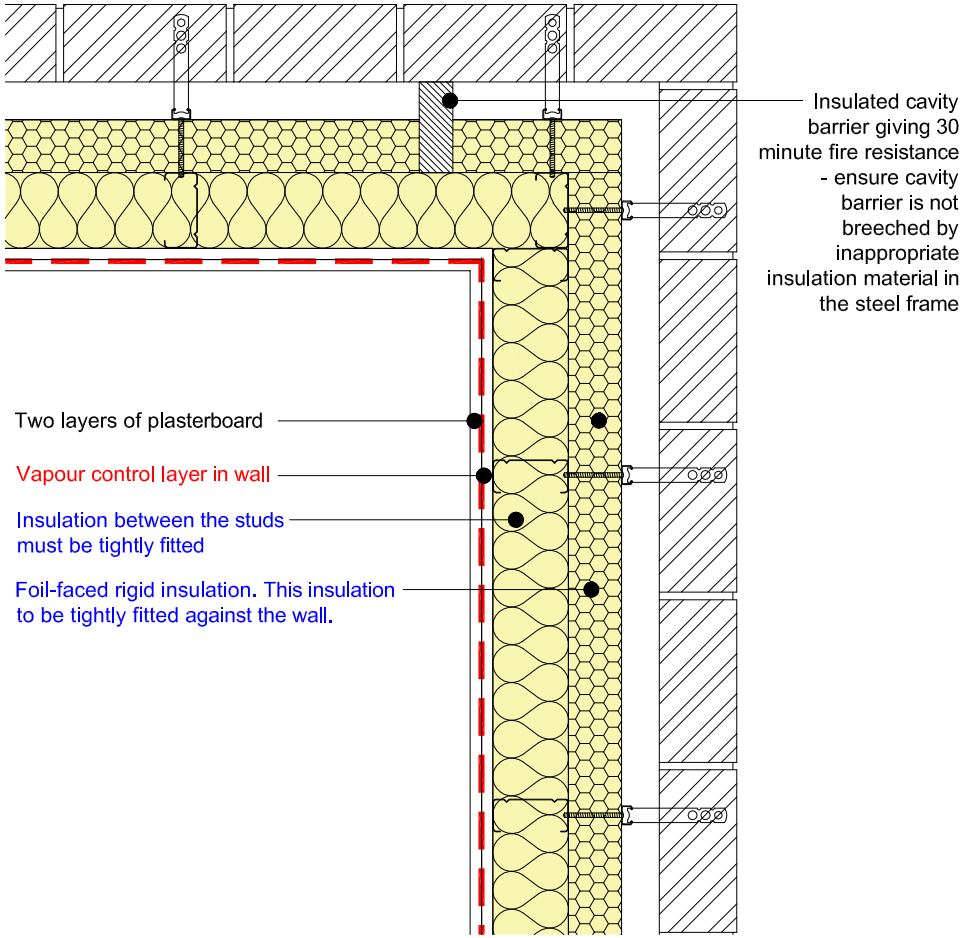
Detail 4.22 (P5)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W

Critical features

1. Ensure insulation is tightly fitted.
2. Install insulated cavity barrier.

Airtightness checklist

1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.

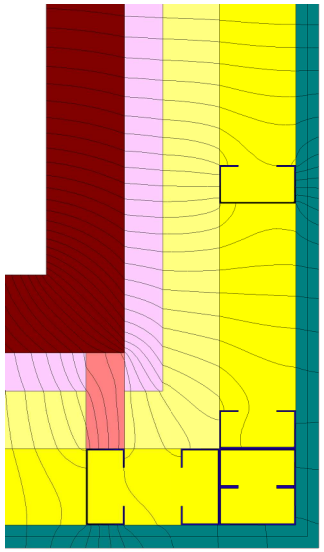
Additional advice

1. Check that insulation is tightly fixed to the steel studs at the corner junction.

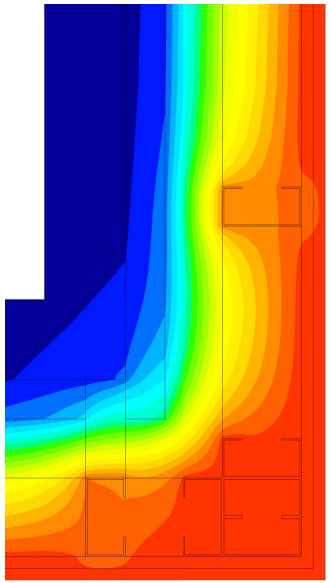
Ψ value = 0·080 W/m·K
Temp. factor = 0·90

Steel Frame: Steel Framing Sections
Wall Junction (Plan view)

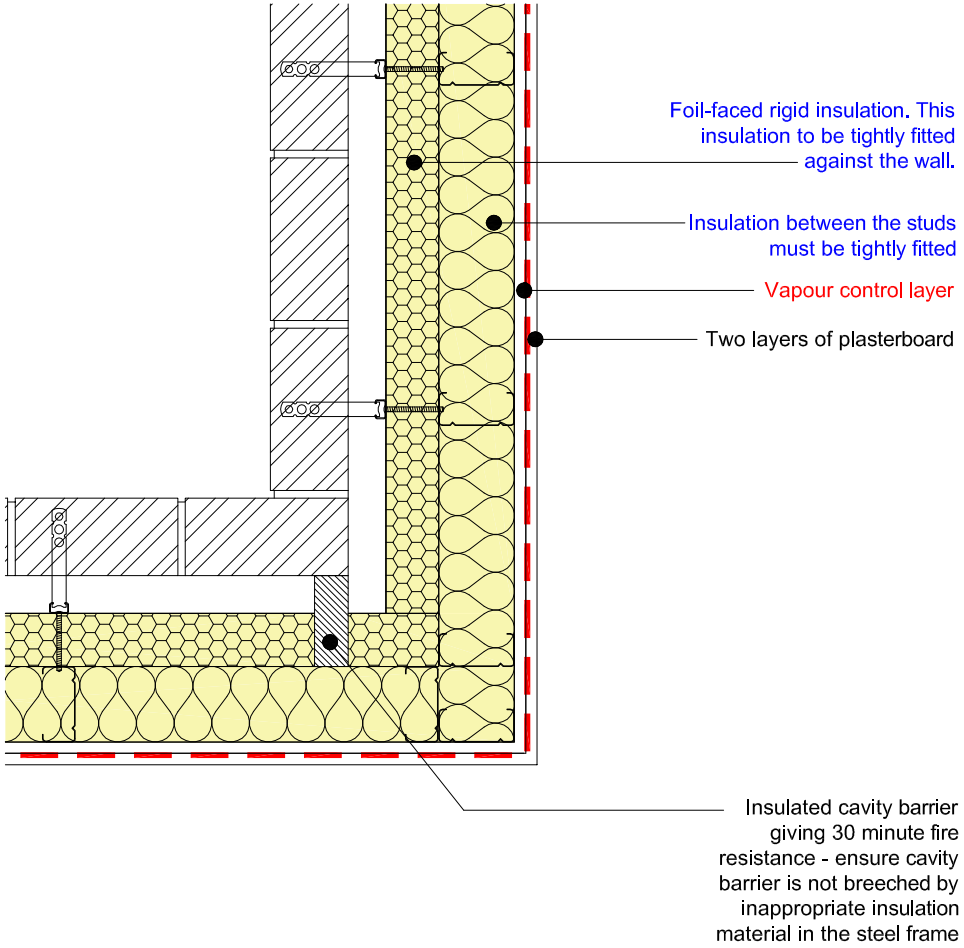
ACDs in support of 2015 energy standards
Detail 4.23 (E16)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W

Critical features

1. Ensure insulation is tightly fitted.
2. Install insulated cavity barrier.

Airtightness checklist

1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.

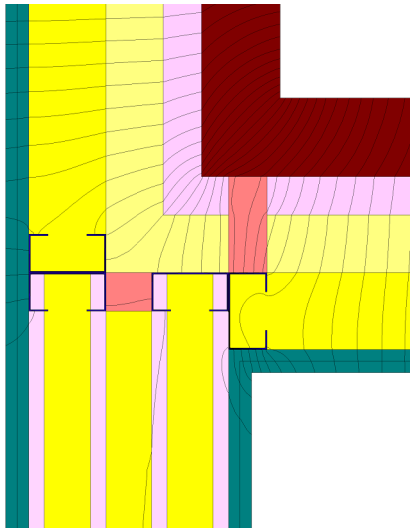
Additional advice

1. Check that insulation is tightly fixed to the steel studs at the corner junction.

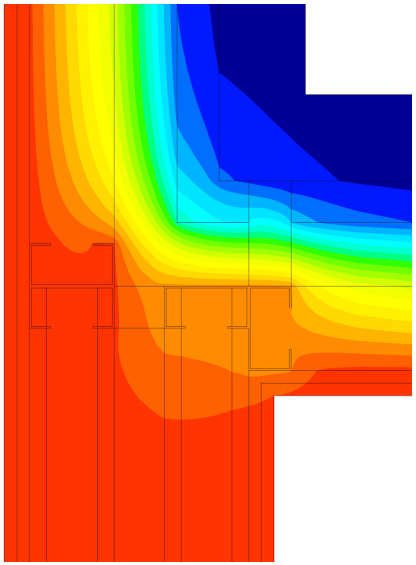
Ψ value = -0·029 W/m·K
Temp. factor = 0·96

Steel Frame: Steel Framing Sections
Wall Junction - Inward Corner (Plan view)

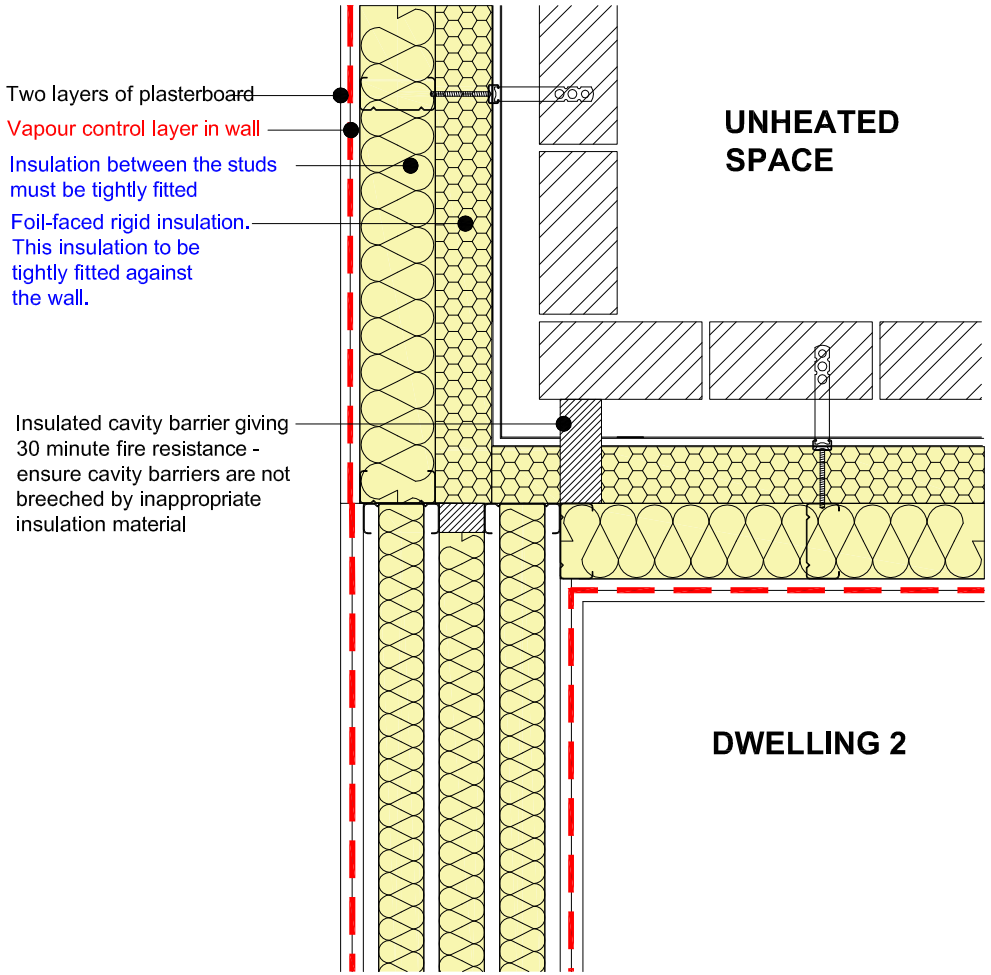
ACDs in support of 2015 energy standards
Detail 4.24 (E17)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W

Critical features

1. Install insulated cavity barrier.
2. Ensure insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.

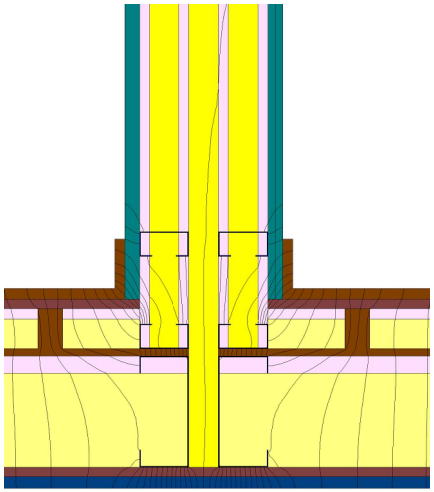
Additional advice

1. Check that insulation is tightly fixed to the steel studs at the corner junction.
2. Cavity wall insulation to be secured to one side of wall only to minimise noise transmission.

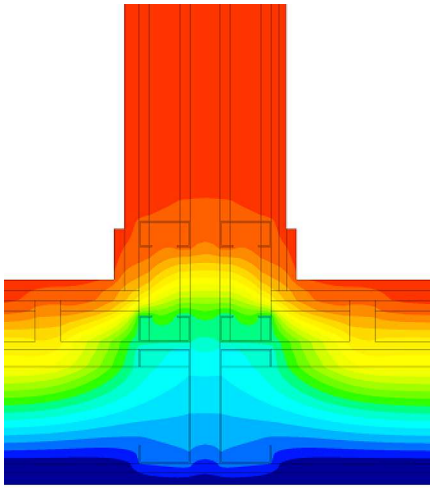
Ψ value = 0·057 W/m·K
Temp. factor = 0·95

Steel Frame: Steel Framing Sections
Staggered party wall between dwellings (Plan view)

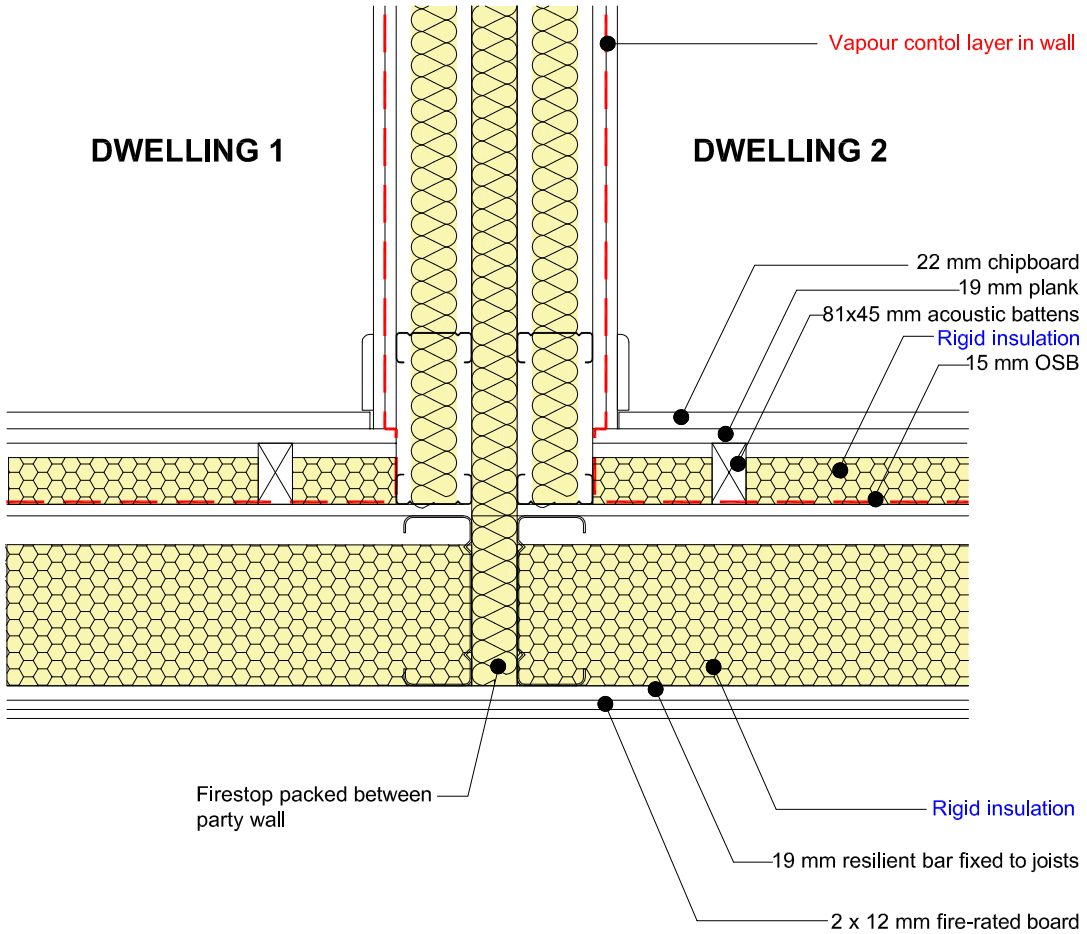
ACDs in support of 2015 energy standards
Detail 4.26 (E25)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Floor (between battens) - 2·73 (m²K)/W
Floor (between joists) - 8·64 (m²K)/W

Critical features

1. Ensure insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used at junctions to wall, floor, ceiling or opening is robustly lapped and taped.

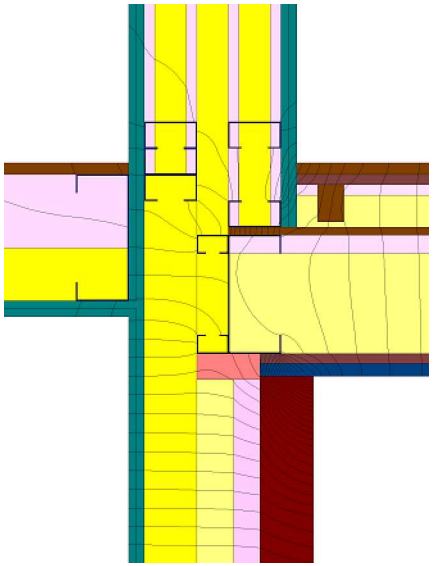
Additional advice

1. Cavity wall insulation to be secured to one side of wall only to minimise noise transmission.

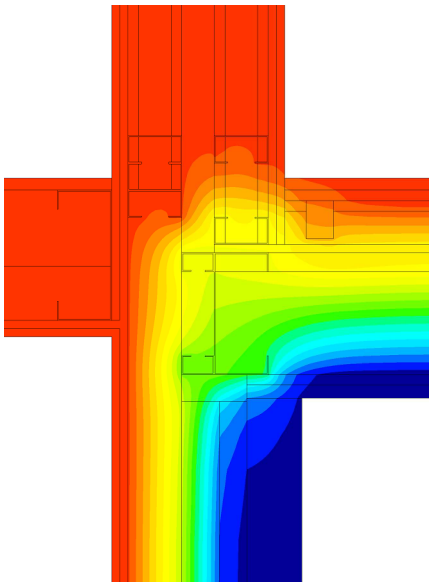
Ψ value = 0·252 W/m·K
Temp. factor = 0·89

Steel Frame: Steel Framing Sections
Exposed floor - normal (Section view)

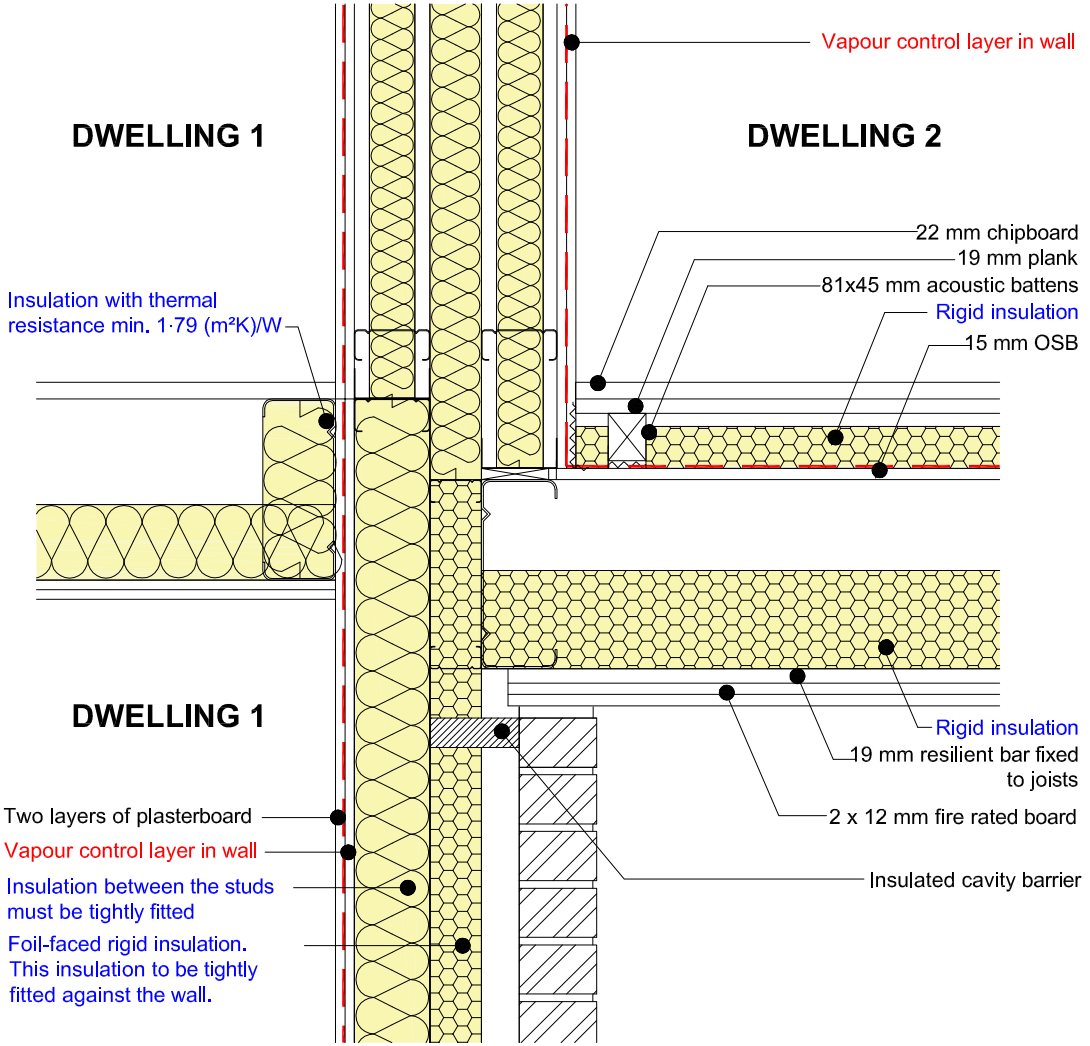
ACDs in support of 2015 energy standards
Detail 4.27 (P7)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

- Wall (cavity) - 3·18 (m²K)/W
- Wall (between studs) - 2·86 (m²K)/W
- Floor (between battens) - 2·73 (m²K)/W
- Floor (between joists) - 8·64 (m²K)/W

Critical features

1. Ensure insulation is tightly fitted.

Airtightness checklist

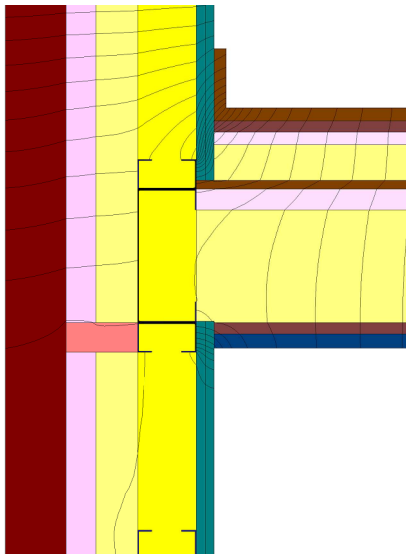
1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

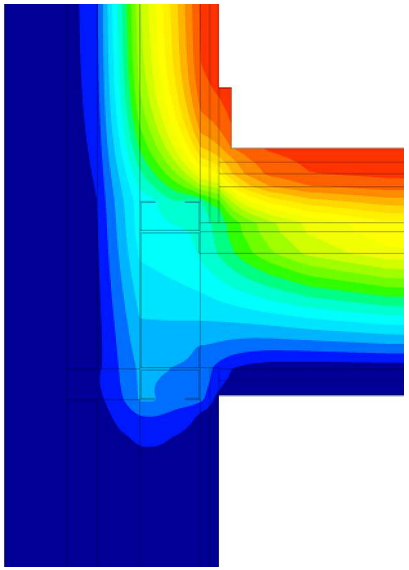
1. Cavity wall insulation to be secured to one side of wall only to minimise noise transmission.

Ψ value = 0·089 W/m·K
Temp. factor = 0·94

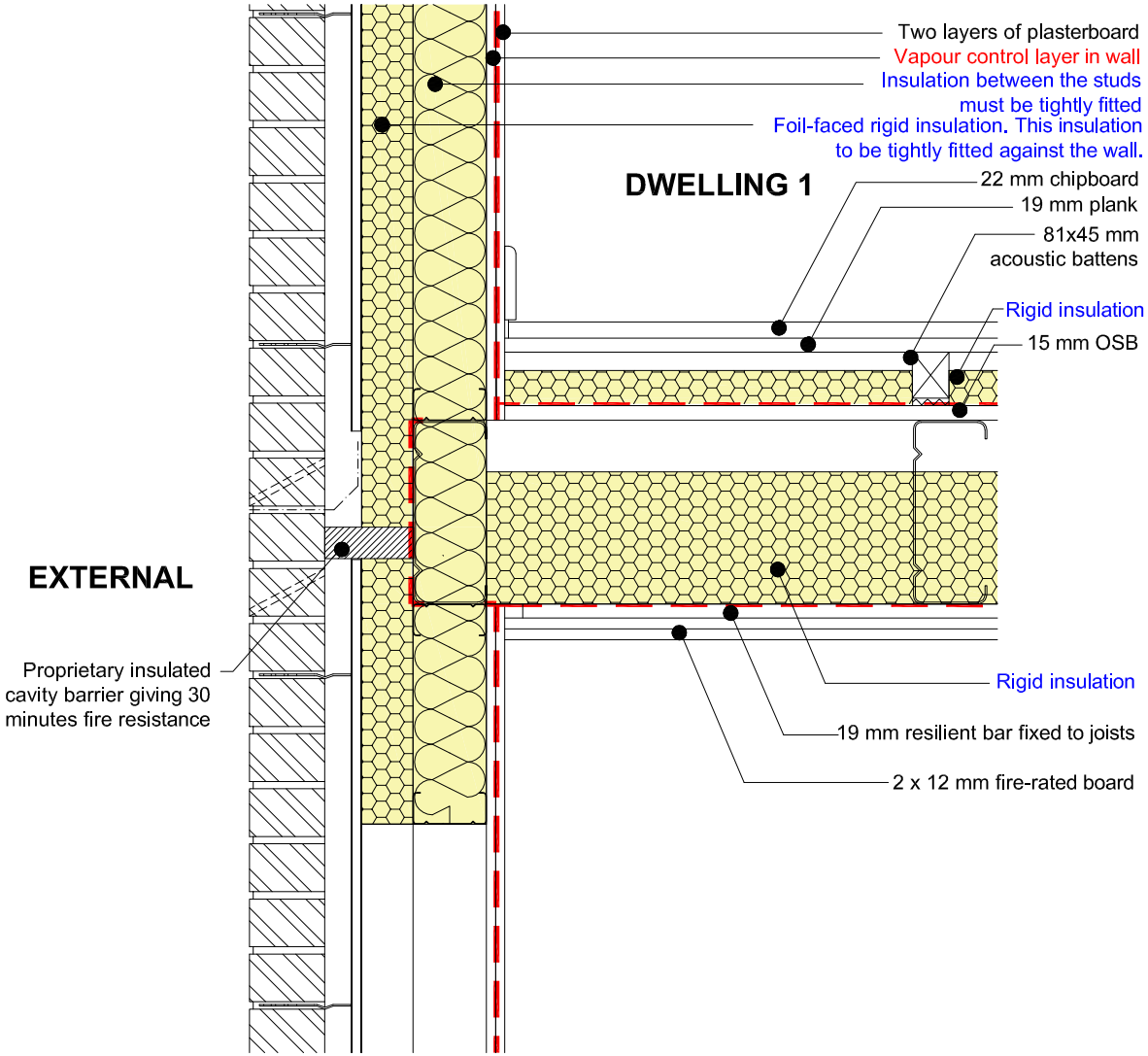
Steel Frame: Steel Framing Sections
Exposed floor - inverted (Section view)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

- Wall (cavity) - 3·18 (m²K)/W
- Wall (between studs) - 2·86 (m²K)/W
- Floor (between battens) - 2·73 (m²K)/W
- Floor (between joists) - 8·64 (m²K)/W

Critical features

1. Ensure insulation is tightly fitted.

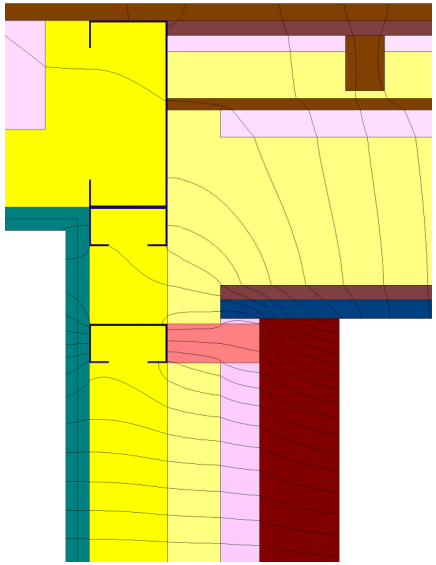
Airtightness checklist

1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Ψ value = 0·110 W/m·K
Temp. factor = 0·85

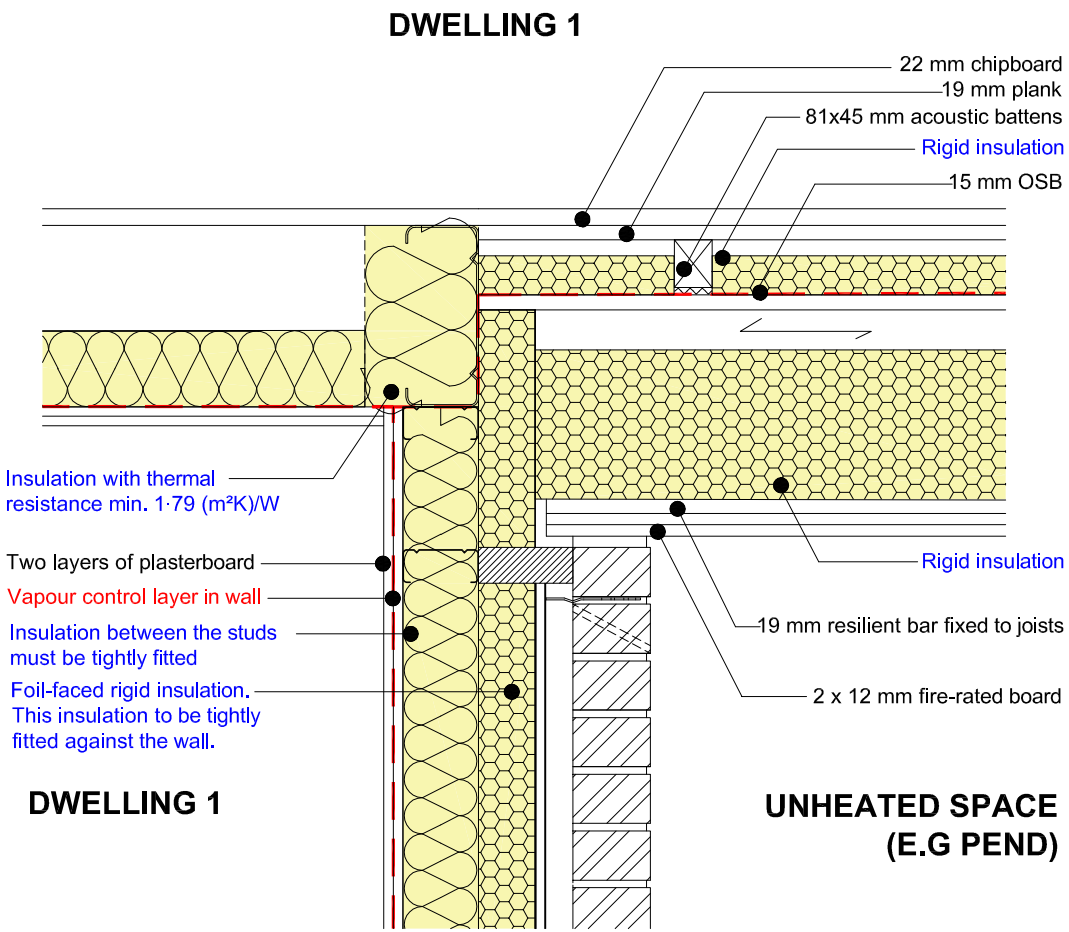
Steel Frame: Steel Framing Sections
Exposed floor - normal (Section view)

ACDs in support of 2015 energy standards
Detail 4.29 (E20)



Heat Flow Distribution diagram
For illustrative purposes only.

Temperature Distribution diagram
For illustrative purposes only.



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

- Wall (cavity) - 3·18 (m²K)/W
- Wall (inner leaf) - 2·86 (m²K)/W
- Floor (between battens) - 2·73 (m²K)/W
- Floor (between joists) - 8·64 (m²K)/W

Critical features

1. Ensure insulation is tightly fitted.

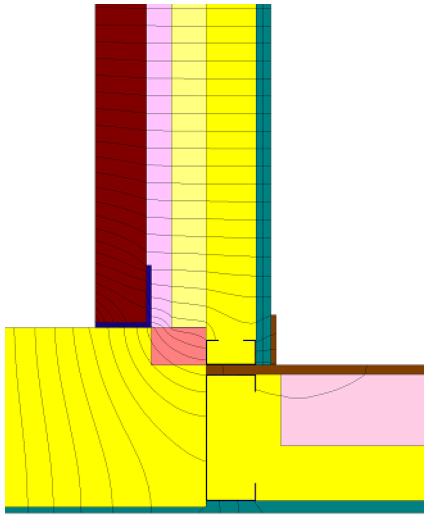
Airtightness checklist

1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.

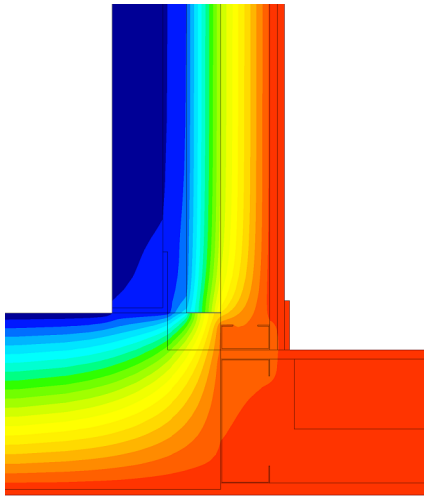
Ψ value = 0·019 W/m·K
Temp. factor = 0·96

Steel Frame: Steel Framing Sections
Exposed floor - inverted (Section view)

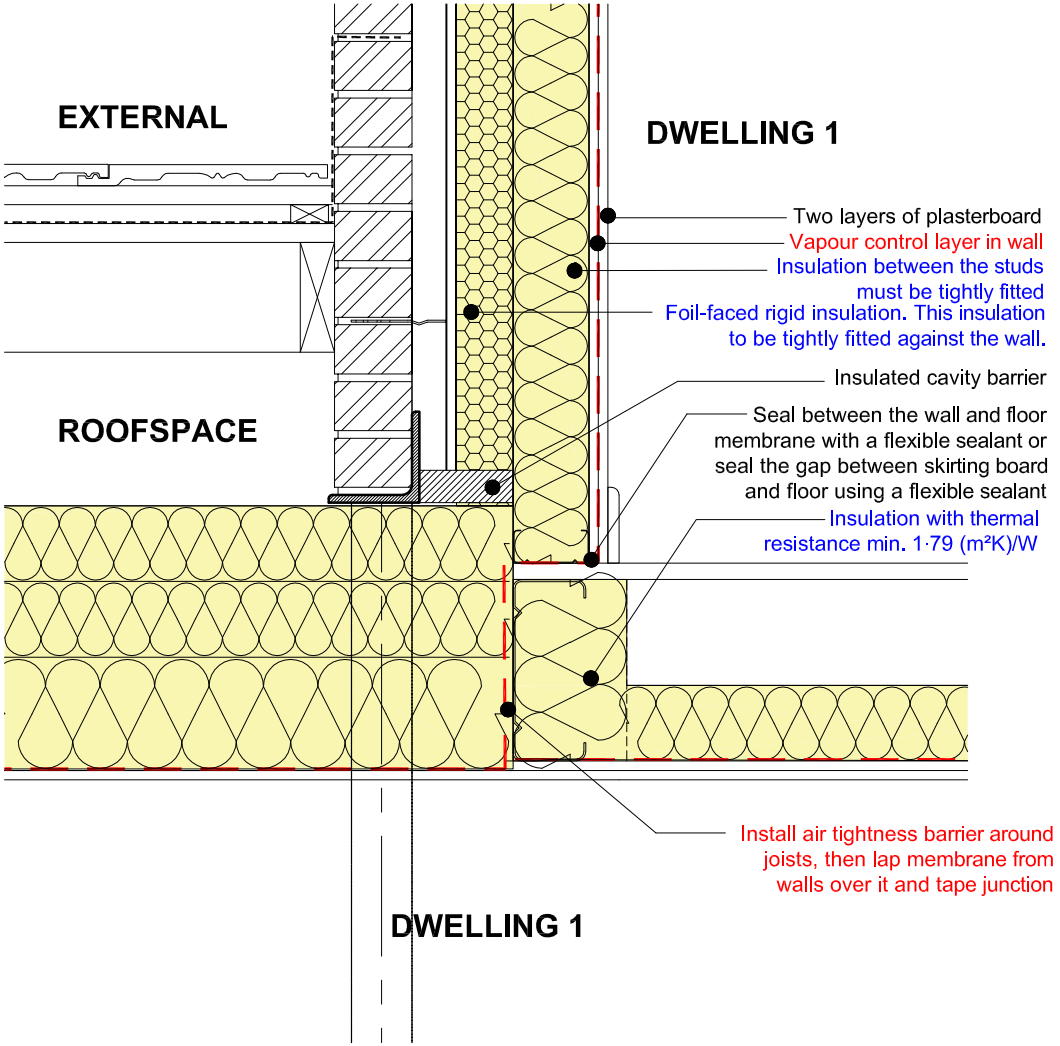
ACDs in support of 2015 energy standards
Detail 4.30 (E21)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W
Roof - 9·00 (m²K)/W

Critical features

1. Ensure insulation is tightly fitted.

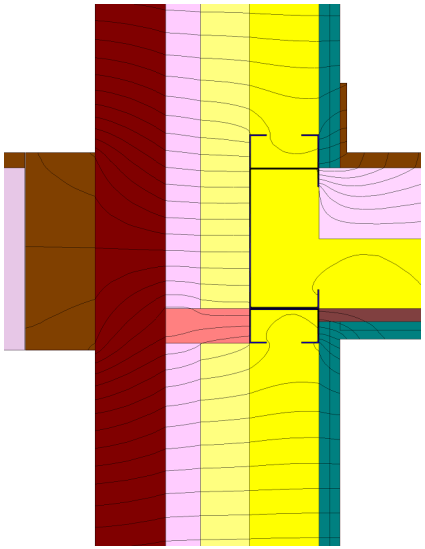
Airtightness checklist

1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.

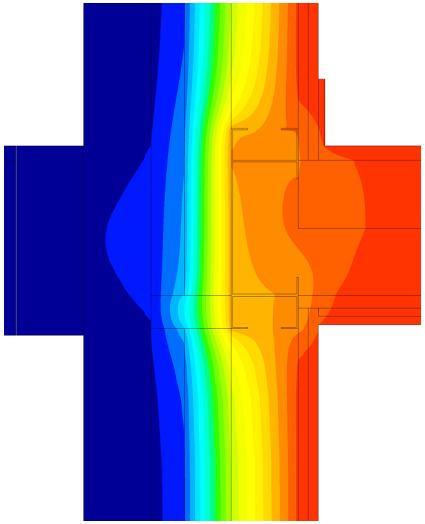
Ψ value = 0·031 W/m·K
Temp. factor = 0·97

Steel Frame: Steel Framing Sections
Eaves (insulation at ceiling level - inverted) (Section view)

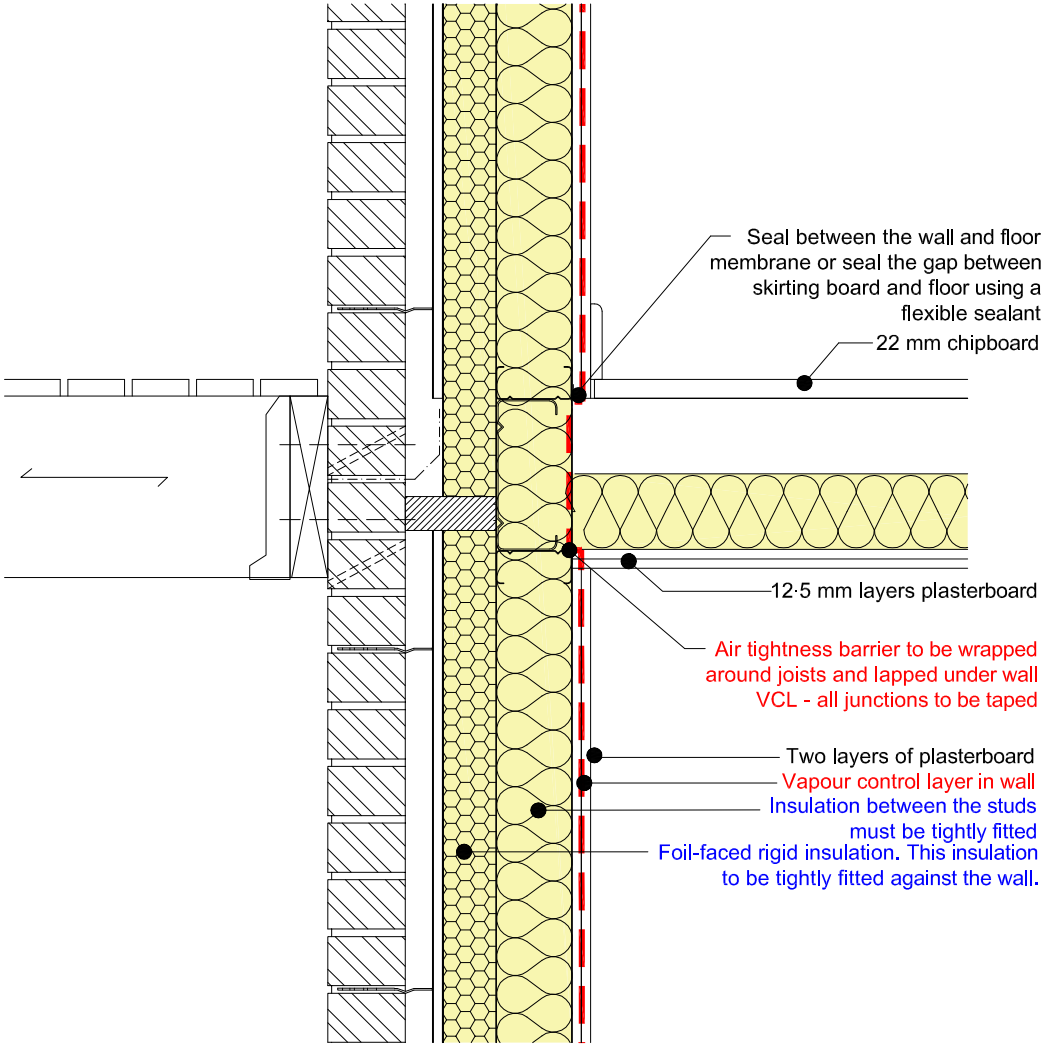
ACDs in support of 2015 energy standards
Detail 4.31 (E24)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity) - 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W

Critical features

1. Check that there is no debris in cavity.
2. Ensure insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

1. Check that insulation is tightly fixed to the steel studs adjacent to the floor junction, leaving no gaps.

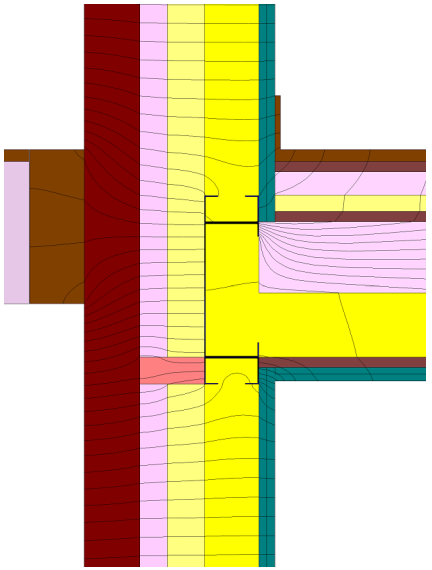
Ψ value = 0·024 W/m·K
Temp. factor = 0·95

Steel Frame: Steel Framing Sections

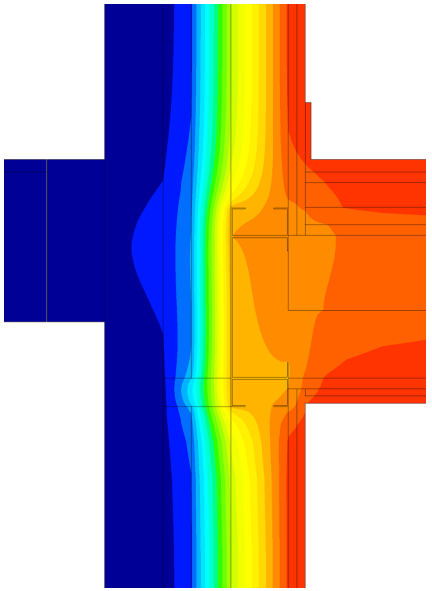
Balcony within a dwelling (wall insulation continuous) (Section view)

ACDs in support of 2015 energy standards

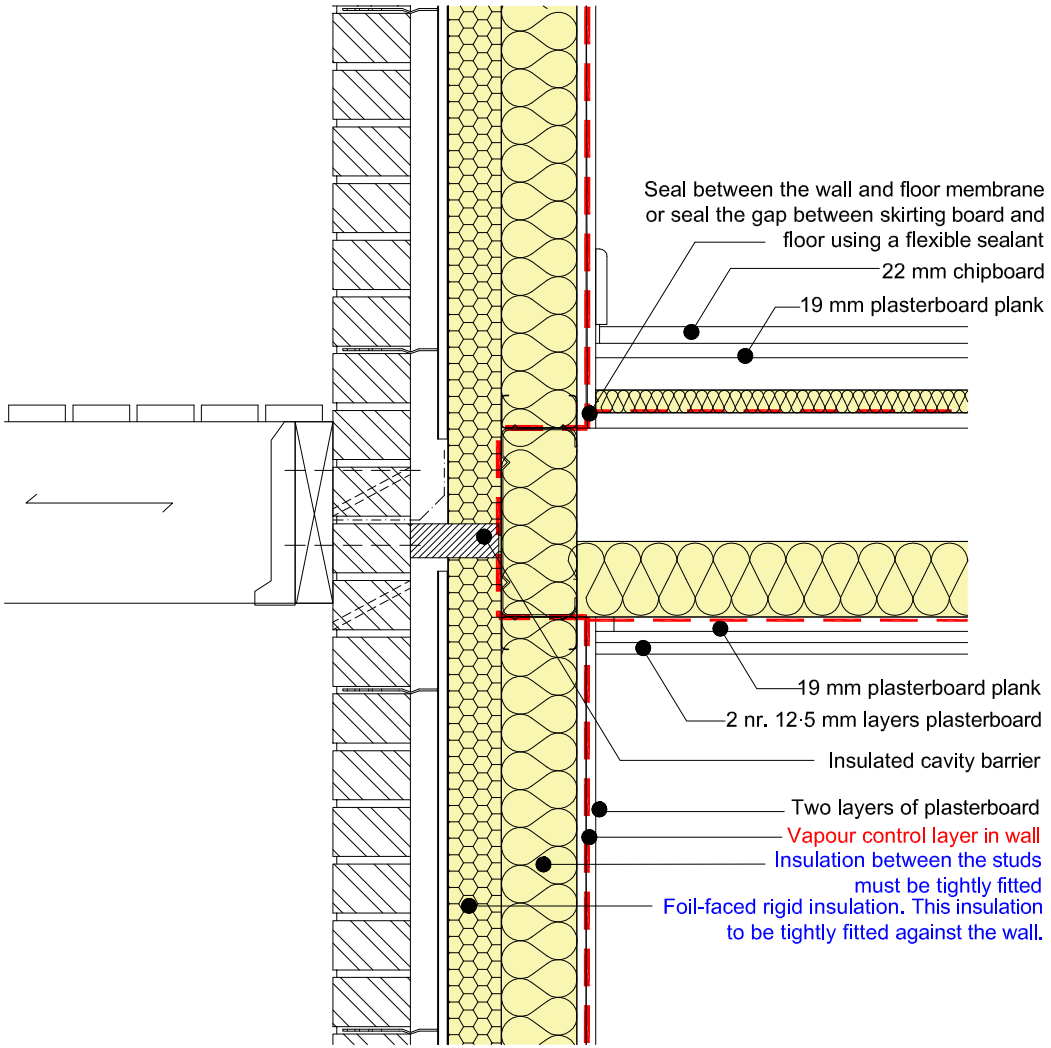
Detail 4.33 (E8)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity)- 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W

Critical features

1. Check that there is no debris in cavity.
2. Ensure insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

1. Check that insulation is tightly fixed to the steel studs adjacent to the floor junction, leaving no gaps.

Ψ value = 0·026 W/m·K
Temp. factor = 0·94

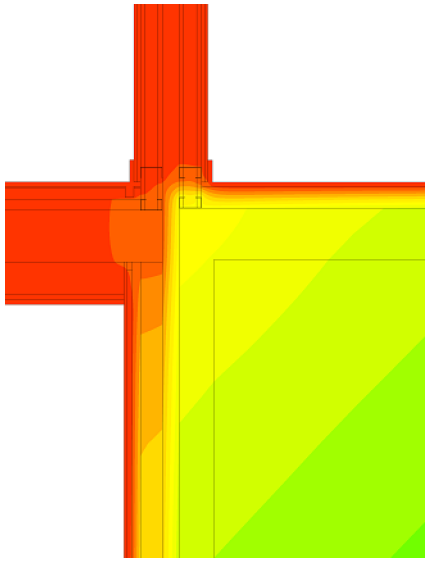
Steel Frame: Steel Framing Sections

Balcony within dwellings (wall insulation continuous) (Section view)

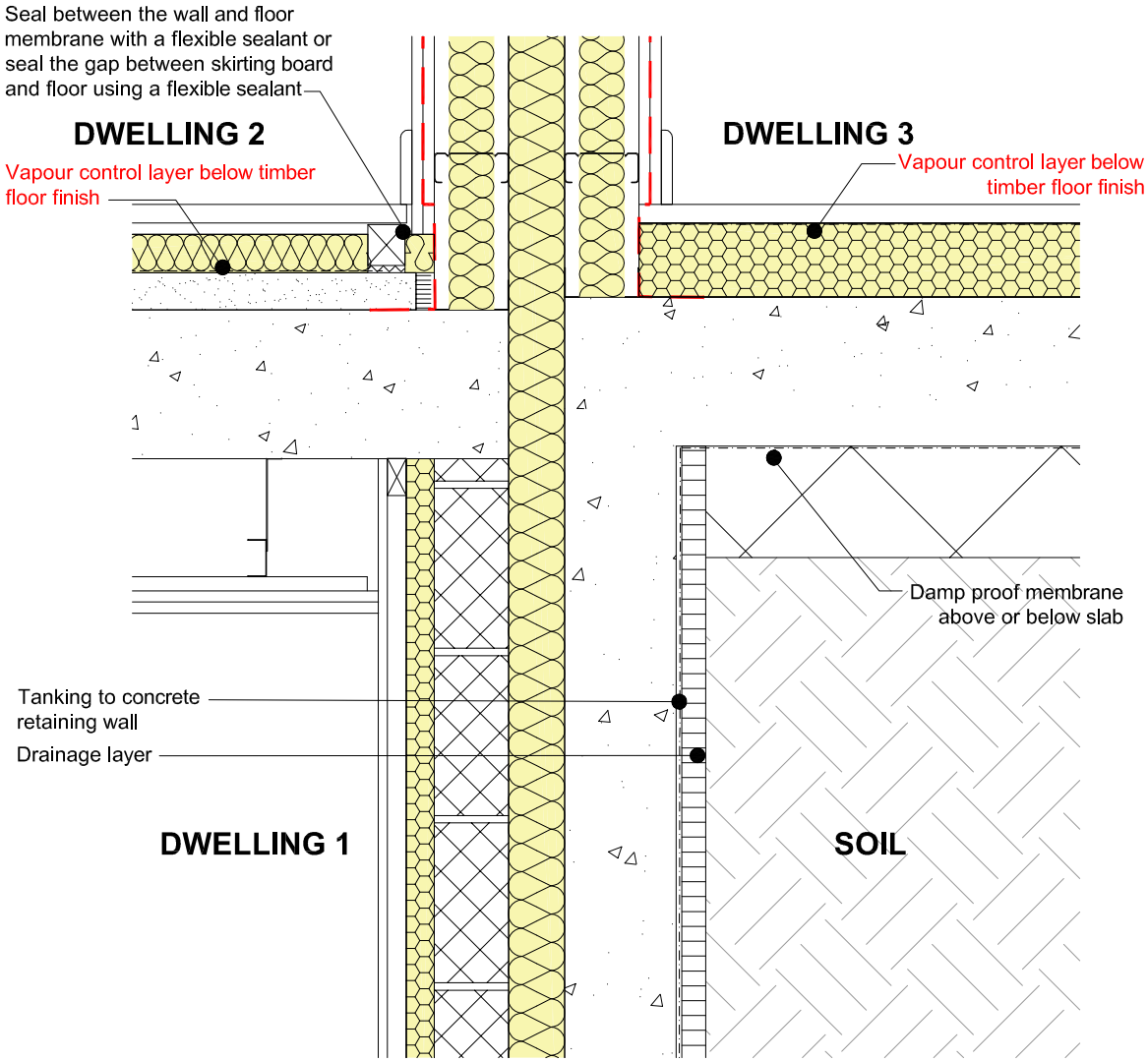
ACDs in support of 2015 energy standards

Detail 4.34 (E9)

Heat Flow Distribution diagram
not available



Temperature Distribution diagram
For illustrative purposes only.



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Floor - 4·55 (m²K)/W
Wall (cavity) - 3·18 (m²K)/W
Wall (inner leaf) - 2·86 (m²K)/W

Critical features

1. Use a lightweight loadbearing concrete block where the wall abuts the concrete slab to minimise thermal bridging.
2. Ensure insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.

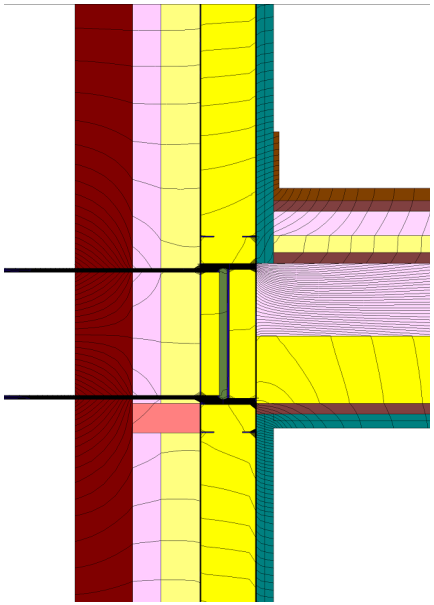
Additional advice

1. Check that concrete slab is level and clear of debris before fitting the insulation at floor level.
2. Cavity wall insulation to be secured to one side of the wall only to minimise noise transmission.
3. Make sure there is no connection between the two masonry leaves except for wall ties, foundation & insulation.

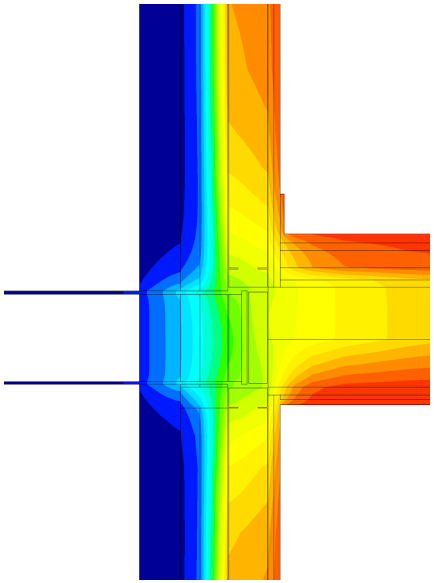
Ψ value = 0·105 W/m·K
Temp. factor = 0·80

Steel Frame: Steel Framing Sections
Ground floor - inverted (Section view)

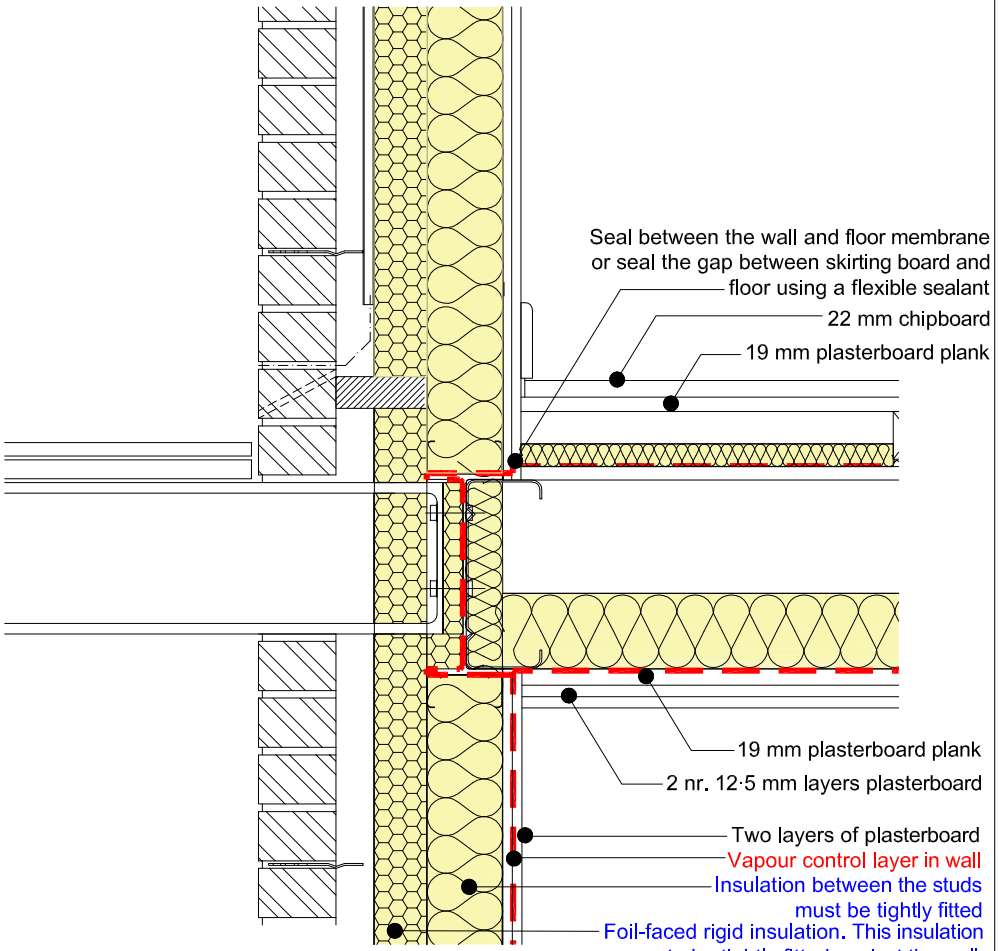
ACDs in support of 2015 energy standards
Detail 4.37 (P6)



Heat Flow Distribution diagram
For illustrative purposes only.



Temperature Distribution diagram
For illustrative purposes only.



For information on separating floor/wall construction refer to Section 2: Fire of the Technical Handbooks
For information on noise refer to Section 5: Noise of the Technical Handbooks

This example should be read in conjunction with the guidance in the introduction to this document. It illustrates the reduction of unwanted infiltration in buildings and provides a Ψ value for this junction situation which can be used in calculation provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Wall (cavity)- 3·18 (m²K)/W
Wall (between studs) - 2·86 (m²K)/W
Wall (internal face) - xx (m²K)/W

Critical features

1. Check that there is no debris in cavity.
2. Ensure insulation is tightly fitted.

Airtightness checklist

1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

1. Check that insulation is tightly fixed to the steel studs adjacent to the floor junction, leaving no gaps.

Ψ value = 0·333 W/m·K
Temp. factor = 0·82

Steel Frame: Steel Framing Sections

Balcony within/between dwellings (insulation penetrated) (Section view)

ACDs in support of 2015 energy standards

Detail 4.38 (E23)