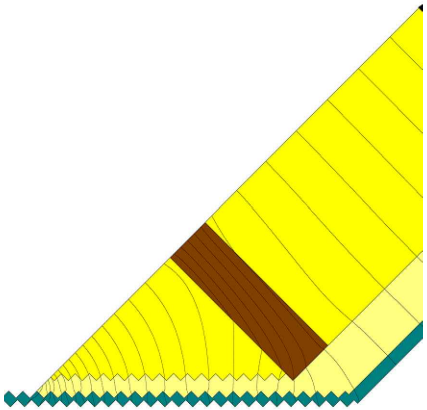
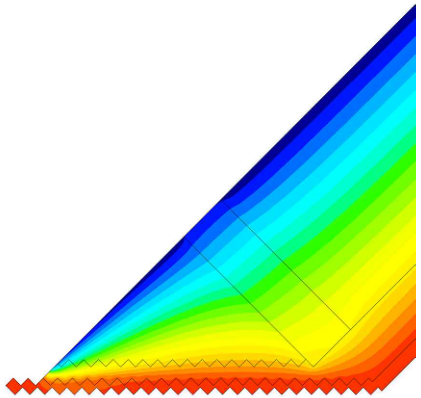
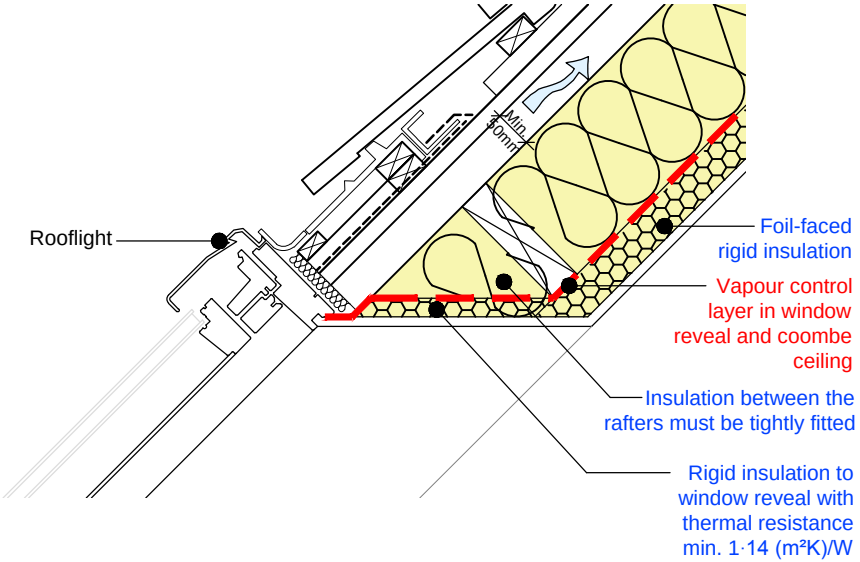


Heat Flow Distribution diagram
For illustrative purposes only.



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:

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

Critical features

1. Ensure that 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 are clear before installing insulation above the ceiling.
2. Ventilation gap equivalent to 5 mm minimum continuous opening is required at ridge to batten space.
3. Ensure 50 mm air gap is maintained between rafters on sloping ceiling.
4. Ensure that internal layer of insulation is fitted tightly into the window reveal, leaving no gaps.
5. Ensure that insulation layers in roof are fitted perpendicularly to cover junctions between batts/rolls.

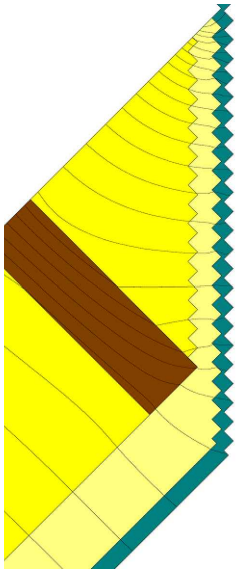
Ψ value = 0·106 W/m·K
Temp. factor = 0·92

General Arrangements

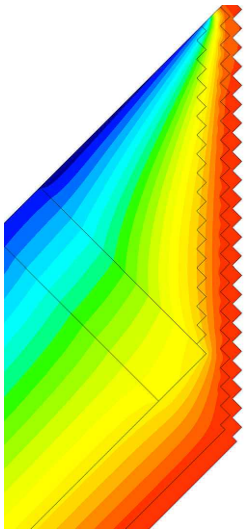
Ventilated Rafters - Rooflight Head (Section View)

ACDs in support of 2015 energy standards

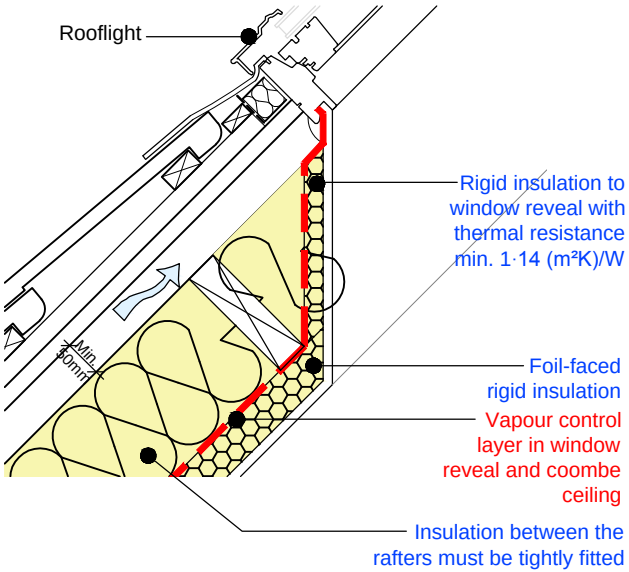
Detail 5.01a (R2)



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:

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

Critical features

1. Ensure that 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 are clear before installing insulation above the ceiling.
2. Ventilation gap equivalent to 5 mm minimum continuous opening is required at ridge to batten space.
3. Ensure 50 mm air gap is maintained between rafters on sloping ceiling.
4. Ensure that internal layer of insulation is fitted tightly into the window reveal, leaving no gaps.
5. Ensure that insulation layers in roof are fitted perpendicularly to cover junctions between batts/rolls.

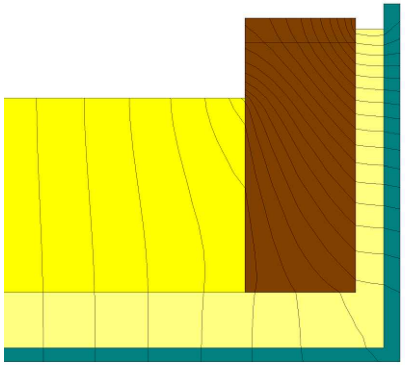
Ψ value = 0·107 W/m·K
Temp. factor = 0·93

General Arrangements

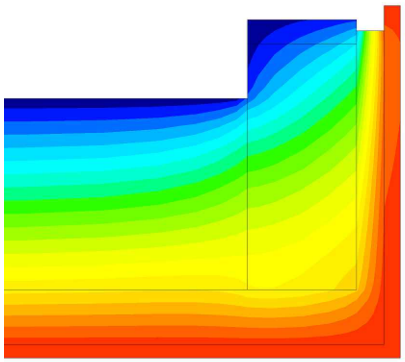
Ventilated Rafters - Rooflight Cill (Section View)

ACDs in support of 2015 energy standards

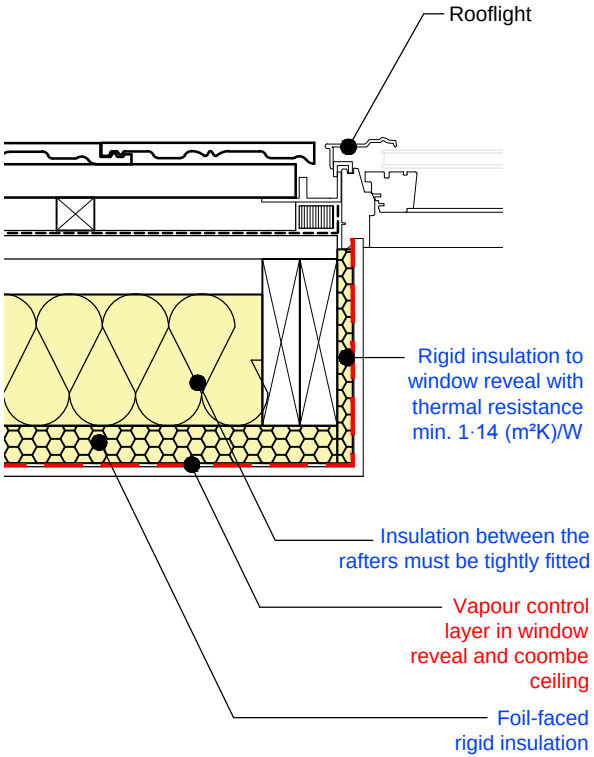
Detail 5.01b (R1)



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:

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

Critical features

1. Ensure that 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 are clear before installing insulation above the ceiling.
2. Ventilation gap equivalent to 5 mm minimum continuous opening is required at ridge to batten space.
3. Ensure 50 mm air gap is maintained between rafters on sloping ceiling.
4. Ensure that internal layer of insulation is fitted tightly into the window reveal, leaving no gaps.
5. Ensure that insulation layers in roof are fitted perpendicularly to cover junctions between batts/rolls.

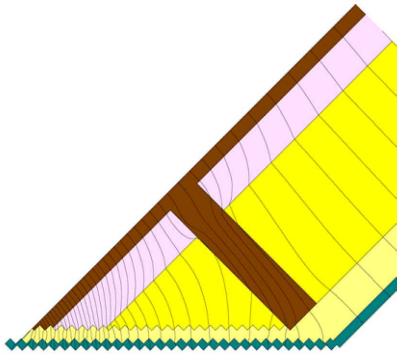
Ψ value = 0·078 W/m·K
Temp. factor = 0·94

General Arrangements

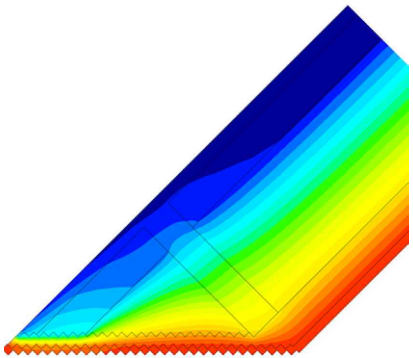
Ventilated Rafters - Rooflight Jamb (Section View)

ACDs in support of 2015 energy standards

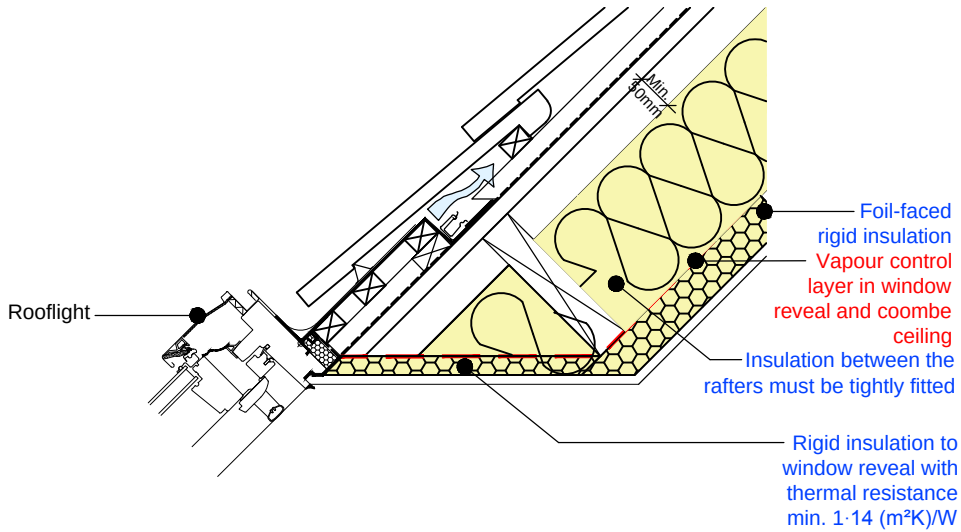
Detail 5.01c (R3)



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:

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

Critical features

1. Ensure that 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 are clear before installing insulation above the ceiling.
2. Ventilation gap equivalent to 5 mm minimum continuous opening is required at ridge to batten space.
3. Ensure 50 mm air gap is maintained between rafters on sloping ceiling.
4. Ensure that internal layer of insulation is fitted tightly into the window reveal, leaving no gaps.
5. Ensure that insulation layers in roof are fitted perpendicularly to cover junctions between batts/rolls.

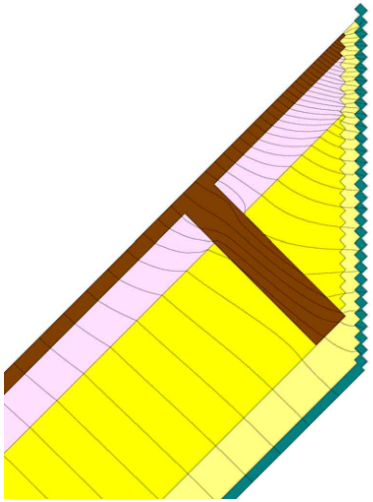
Ψ value = 0·142 W/m·K
Temp. factor = 0·90

General Arrangements

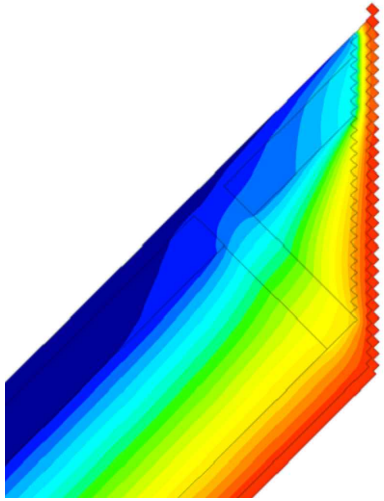
Ventilated Batten Void (warm roof) - Rooflight Head (Section View)

ACDs in support of 2015 energy standards

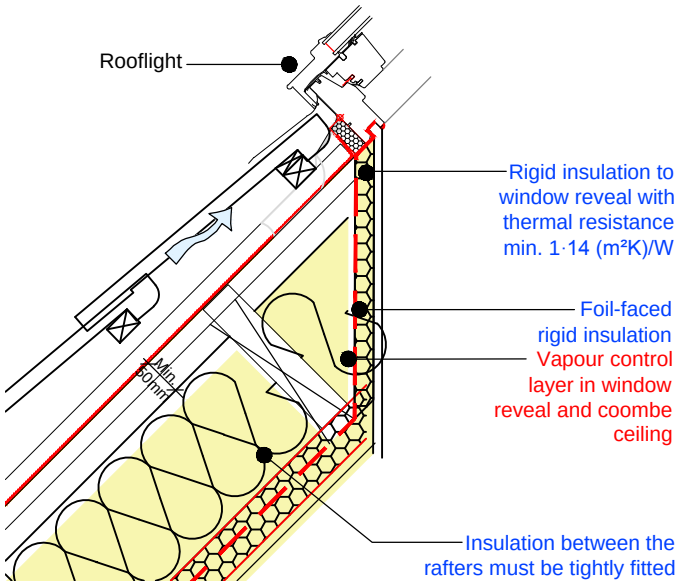
Detail 5.02a (R2)



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:

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

Critical features

1. Ensure that 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 are clear before installing insulation above the ceiling.
2. Ventilation gap equivalent to 5 mm minimum continuous opening is required at ridge to batten space.
3. Ensure 50 mm air gap is maintained between rafters on sloping ceiling.
4. Ensure that internal layer of insulation is fitted tightly into the window reveal, leaving no gaps.
5. Ensure that insulation layers in roof are fitted perpendicularly to cover junctions between batts/rolls.

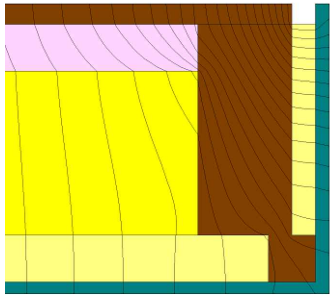
Ψ value = 0·144 W/m·K
Temp. factor = 0·92

General Arrangements

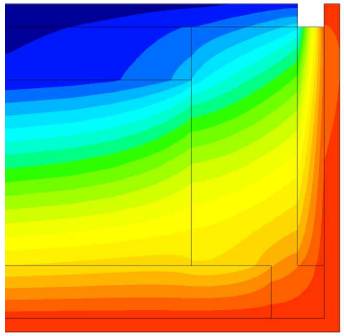
Ventilated Batten Void (warm roof) - Rooflight Cill (Section View)

ACDs in support of 2015 energy standards

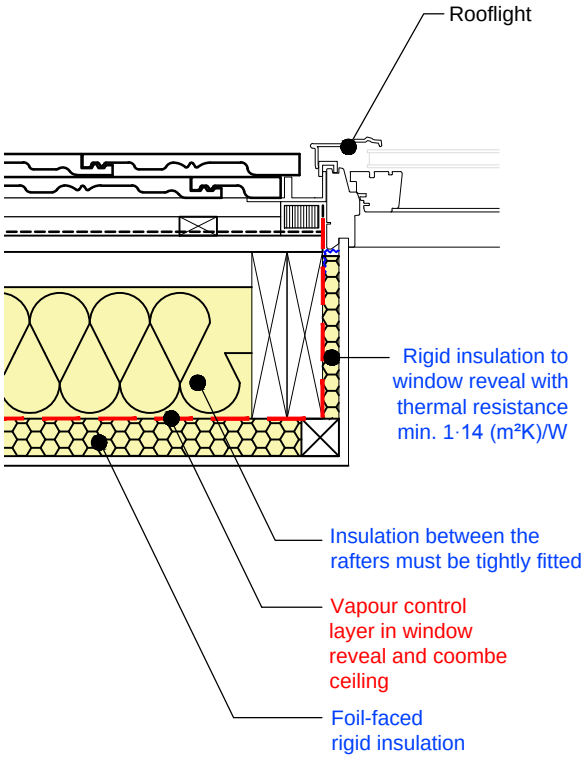
Detail 5.02b (R1)



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:

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

Critical features

1. Ensure that 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 are clear before installing insulation above the ceiling.
2. Ventilation gap equivalent to 5 mm minimum continuous opening is required at ridge to batten space.
3. Ensure 50 mm air gap is maintained between rafters on sloping ceiling.
4. Ensure that internal layer of insulation is fitted tightly into the window reveal, leaving no gaps.
5. Ensure that insulation layers in roof are fitted perpendicularly to cover junctions between batts/rolls.

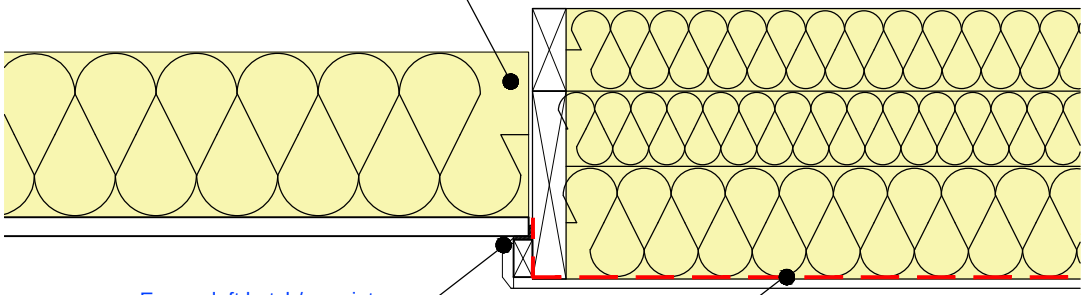
Ψ value = 0·068 W/m·K
Temp. factor = 0·95

General Arrangements

Ventilated Batten Void (warm roof) - Rooflight Jamb (Section View)

ACDs in support of 2015 energy standards

Detail 5.02c (R3)



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 provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Roof (flat ceiling) - 9·00 (m²K)/W

Critical features

1. Ensure that insulation is tightly fitted.
2. Ensure that insulation layers in roof are fitted perpendicularly, to cover junctions
3. Ensure that insulation is fitted on top of the loft access hatch.

Airtightness checklist

1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.
2. Ensure that any air tightness barrier used in the ceiling is turned up into hatch opening.

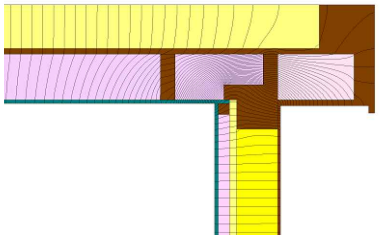
Additional advice

1. Check ventilation paths are clear before installing insulation above the ceiling.
2. Check that full depth of insulation is installed to the back of the loft hatch.

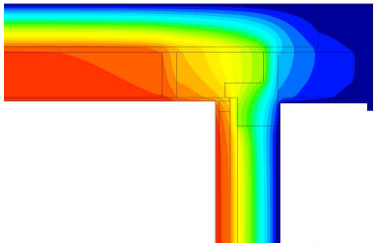
General Arrangements
Attic hatch (Section view)

ACDs in support of 2015 energy standards

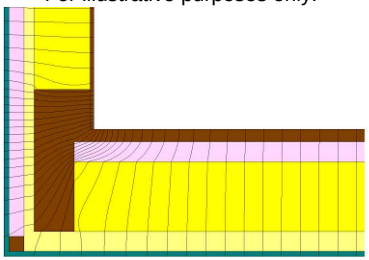
Detail 5.03



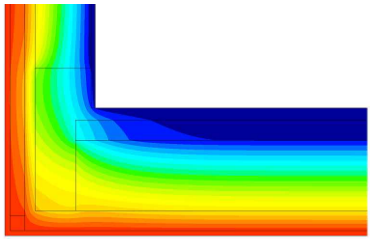
R9 - Heat Flow Distribution diagram
For illustrative purposes only.



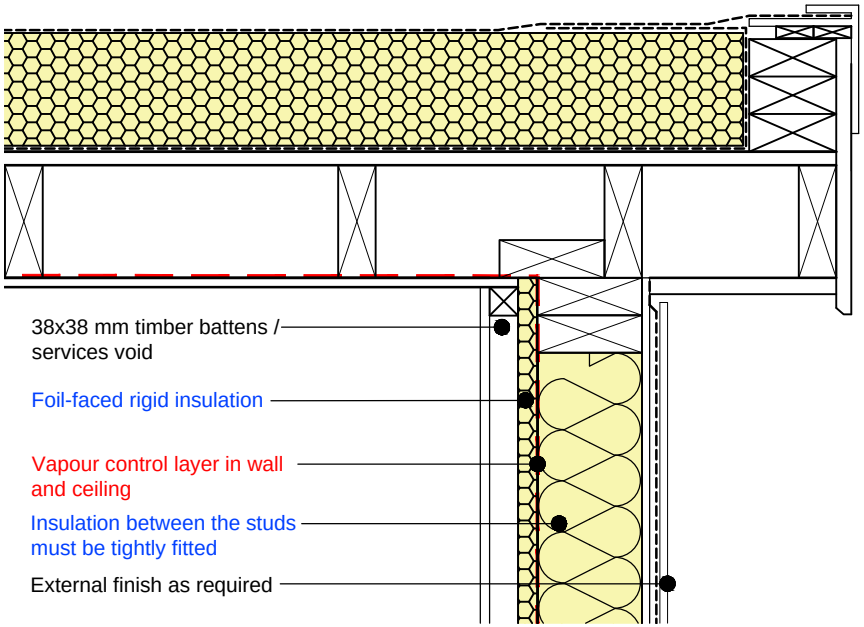
R9 - Temperature Distribution diagram
For illustrative purposes only.

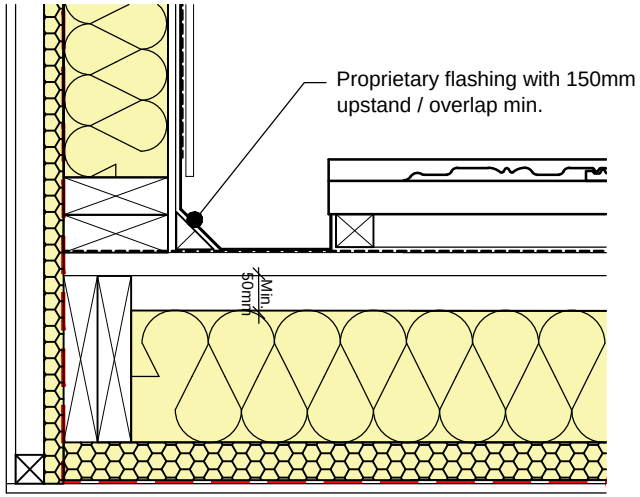


R7 - Heat Flow Distribution diagram
For illustrative purposes only.



R7 - 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) - 4·00 (m²K)/W
- Wall (inner leaf) - 1·14 (m²K)/W
- Pitched Roof (between rafters)- 6·48 (m²K)/W
- Pitched Roof (below rafters)- 2·27 (m²K)/W
- Flat Roof (above deck) - 6·82 (m²K)/W

Critical features

1. Ensure that roof insulation fully laps dormer wall insulation, with minimum 50mm overlap at narrowest point.
2. Ensure that insulation is tightly fitted.
3. Ensure that insulation layers in roof are laid perpendicularly, to cover junctions.

Airtightness checklist

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

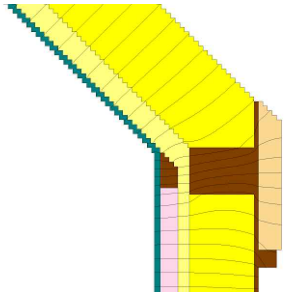
Ψ value (R9) = 0·175 W/m·K
Temp. factor (R9) = 0·88
Ψ value (R7) = -0·033 W/m·K
Temp. factor (R7) = 0·97

General Arrangements

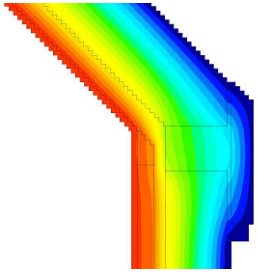
Dormer in timber roof: Flat dormer-Cheek & Verge (Section view)

ACDs in support of 2015 energy standards

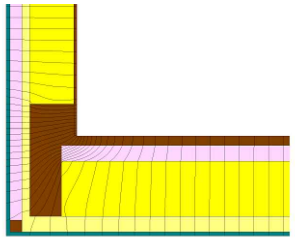
Detail 5.04 (R9/R7)



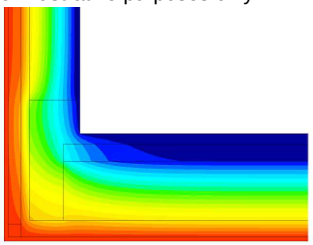
R8 - Heat Flow Distribution diagram
For illustrative purposes only.



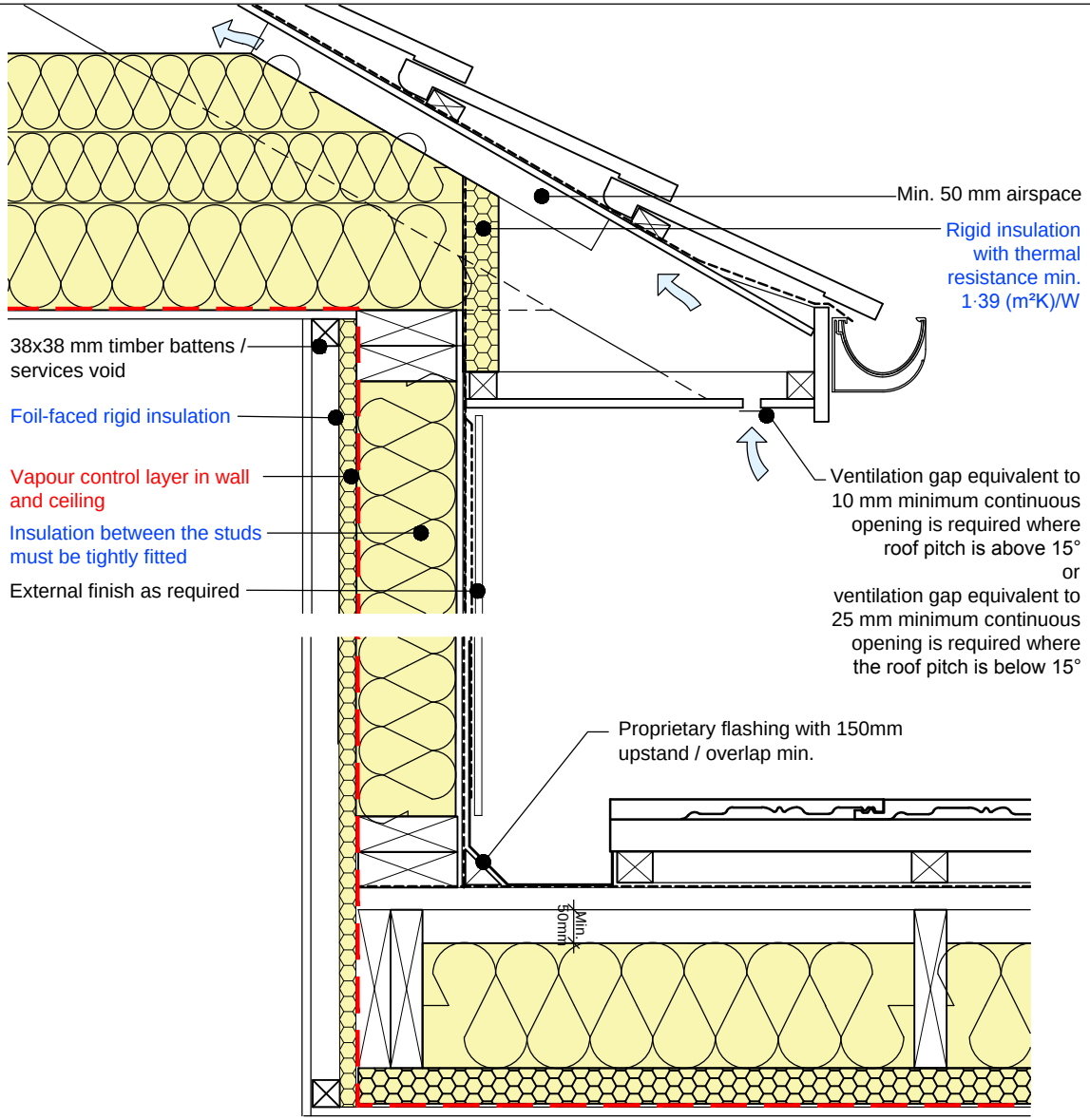
R8 - Temperature Distribution diagram
For illustrative purposes only.



R7 - Heat Flow Distribution diagram
For illustrative purposes only.



R7 - 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) - 4·00 (m²K)/W
- Wall (inner leaf) - 1·14 (m²K)/W
- Pitched Roof (between rafters)- 6·48 (m²K)/W
- Pitched Roof (below rafters)- 2·27 (m²K)/W
- Roof - 9·00 (m²K)/W

Critical features

1. Ensure that roof insulation fully laps dormer wall insulation, with minimum 50mm overlap at narrowest point.
2. Ensure that insulation is tightly fitted.
3. Ensure that insulation layers in roof are laid perpendicularly, to cover junctions.

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 are clear before installing insulation above the ceiling.

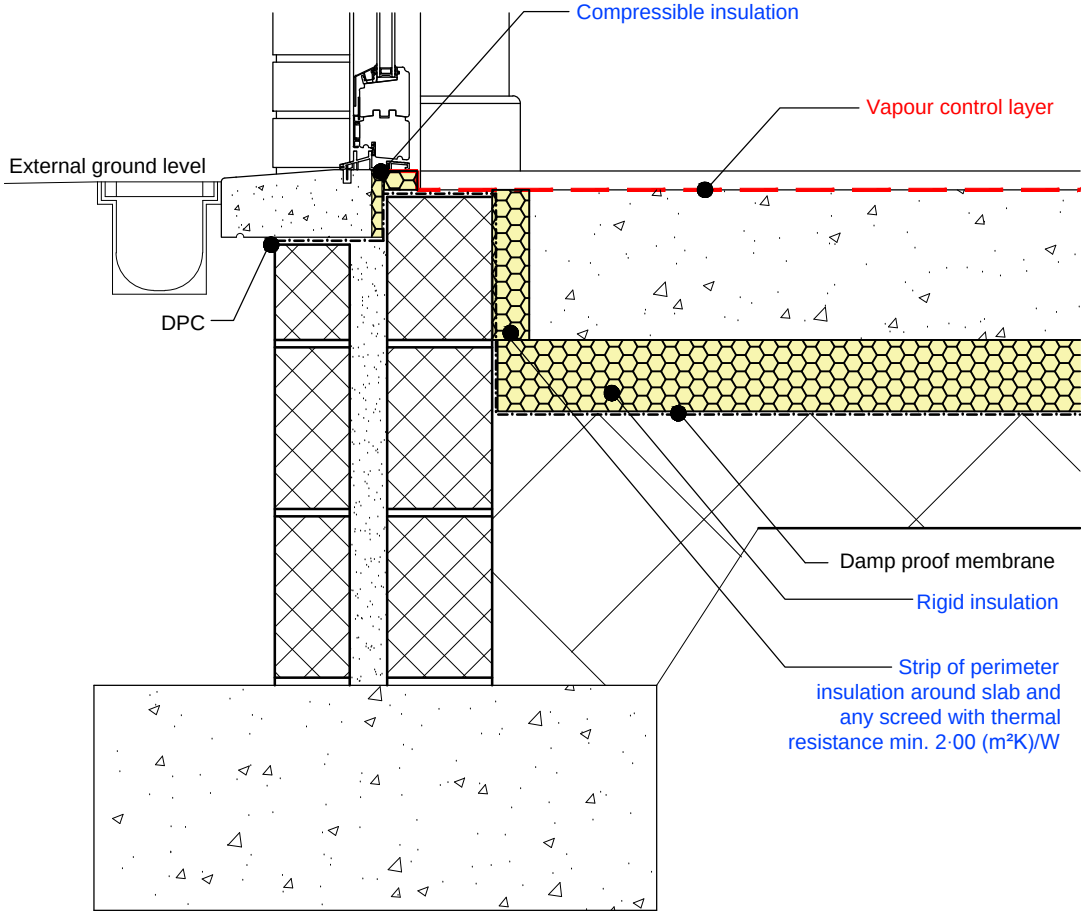
Ψ value (R8) = 0·017 W/m·K
Temp. factor (R8) = 0·96
Ψ value (R7) = 0·017 W/m·K
Temp. factor (R7) = 0·96

General Arrangements

Dormer in timber roof: Rectangular dormer-Cheek & Verge (Section view)

ACDs in support of 2015 energy standards

Detail 5.05 (R8/R7)



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 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. 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 there are no gaps left in the construction below the threshold.

Airtightness checklist

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

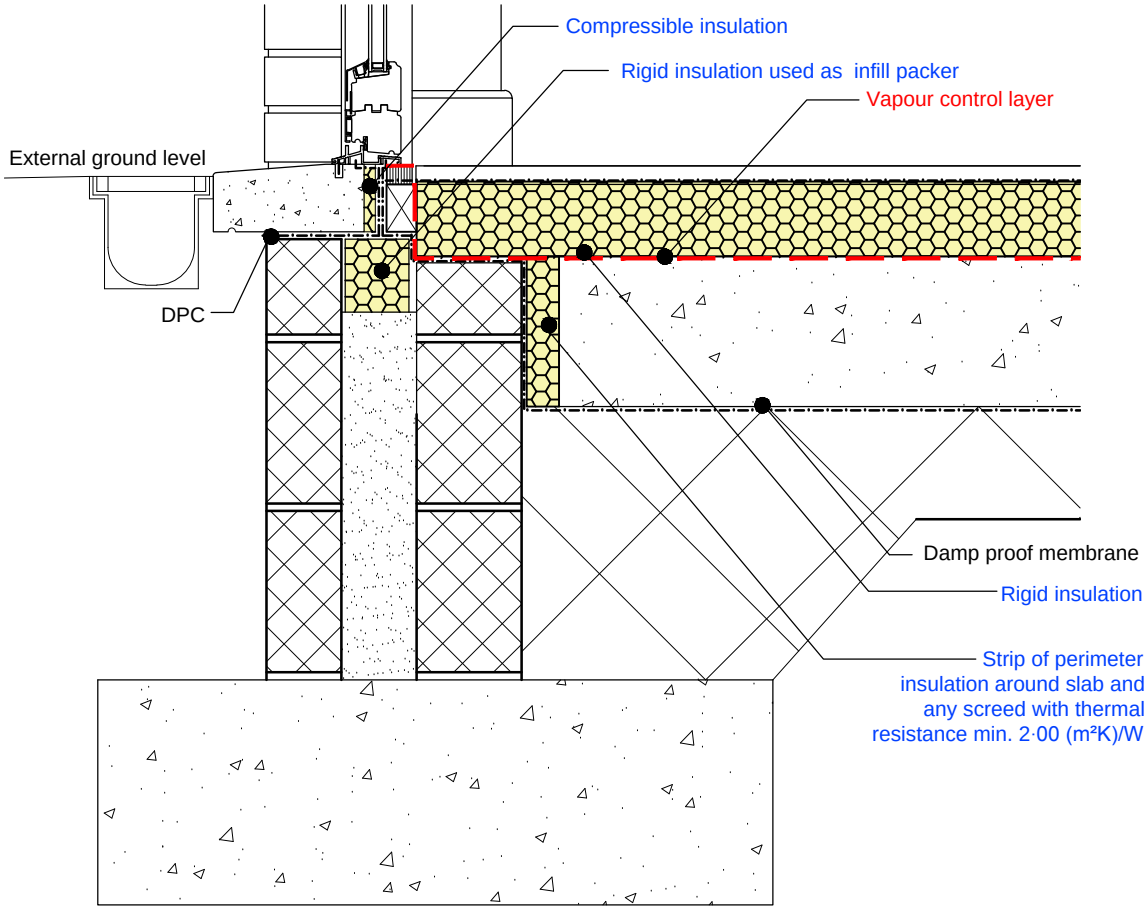
Additional advice

1. Check that concrete slab is level and clear of debris before fitting the insulation at floor level.
2. Check that the threshold is fully supported during construction.

General Arrangements
Door threshold (Level): Insulation below slab (Section view)

ACDs in support of 2015 energy standards

Detail 5.06



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 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. 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 there are no gaps left in the construction below the threshold.

Airtightness checklist

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

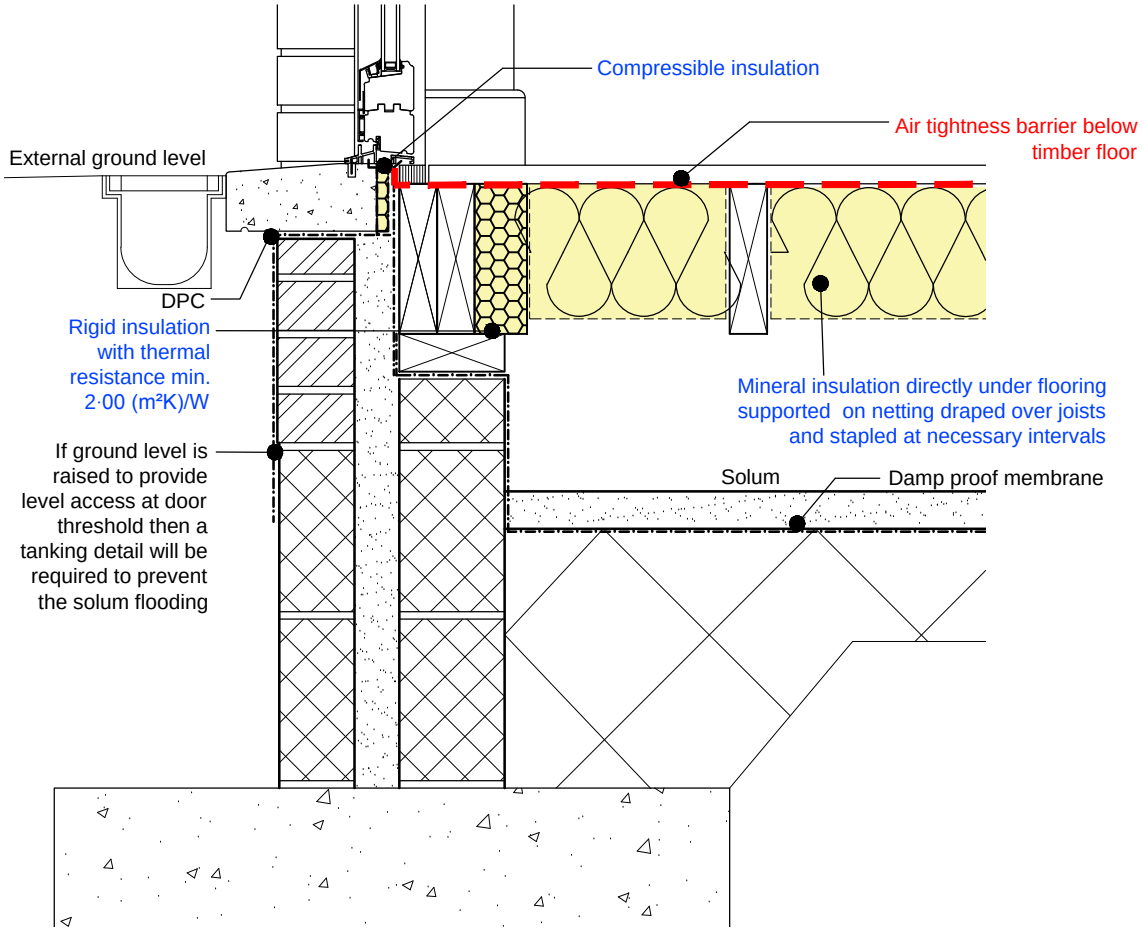
Additional advice

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

General Arrangements
Door threshold (Level): Insulation above slab (Section view)

ACDs in support of 2015 energy standards

Detail 5.07



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 provided the principles outlined and any identified component specification are followed.

Calculation conditions

Thermal Resistance of insulation used in details:

Floor - 6·67 (m²K)/W

Critical features

1. Use a perimeter strip of insulation where the timber floor abuts the external wall.
2. Ensure that insulation is tightly fitted.
3. Ensure that there are no gaps left in the construction below the threshold.

Airtightness checklist

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

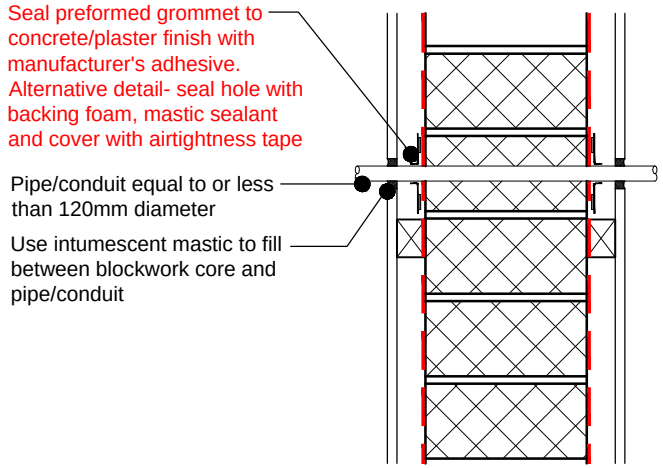
Additional advice

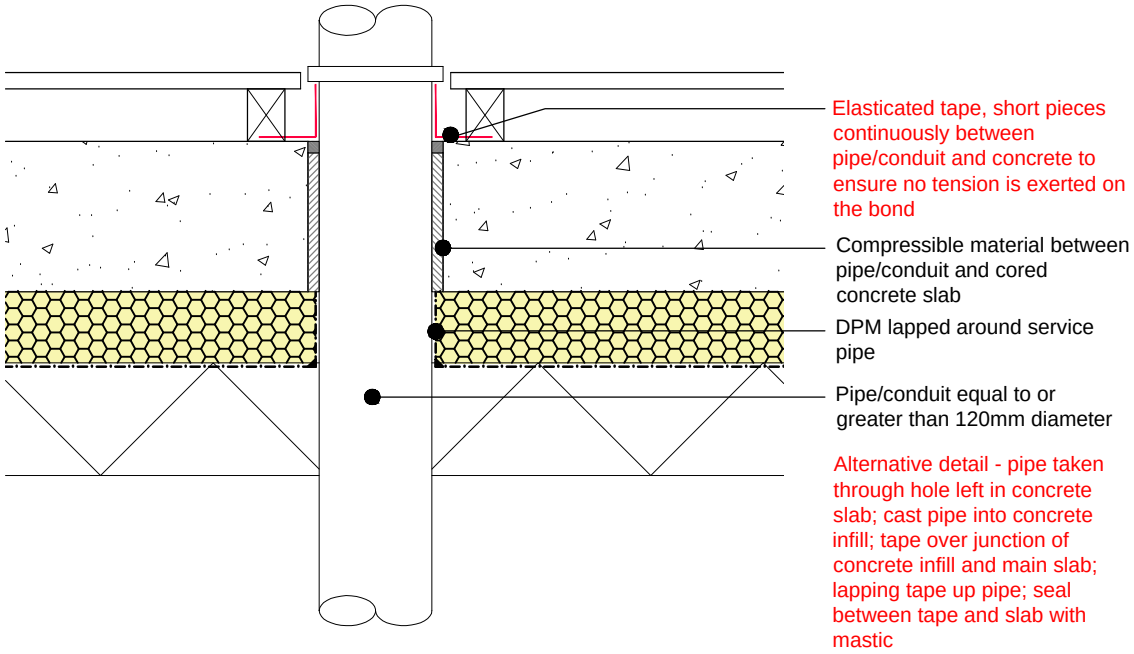
1. Check that all ventilation paths are clear before installing the floor insulation.

General Arrangements
Door threshold (Level): Timber suspended floor (Section view)

ACDs in support of 2015 energy standards

Detail 5.08





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 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. Ensure that insulation is tightly fitted between the pipe/conduit and any hole made through the floor or wall construction.

Airtightness checklist

1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.
2. Seal around any services penetration through the airtightness barrier using a flexible sealant or tape.
3. Ensure that any airtightness layer used in the wall overlaps with the layer in the floor.
4. Casting-in suitably-sized pipes and flexible trunking through the slab at an early stage will typically make it easier to achieve an effective and robust airtight seal around penetrations through the slab.

Additional advice

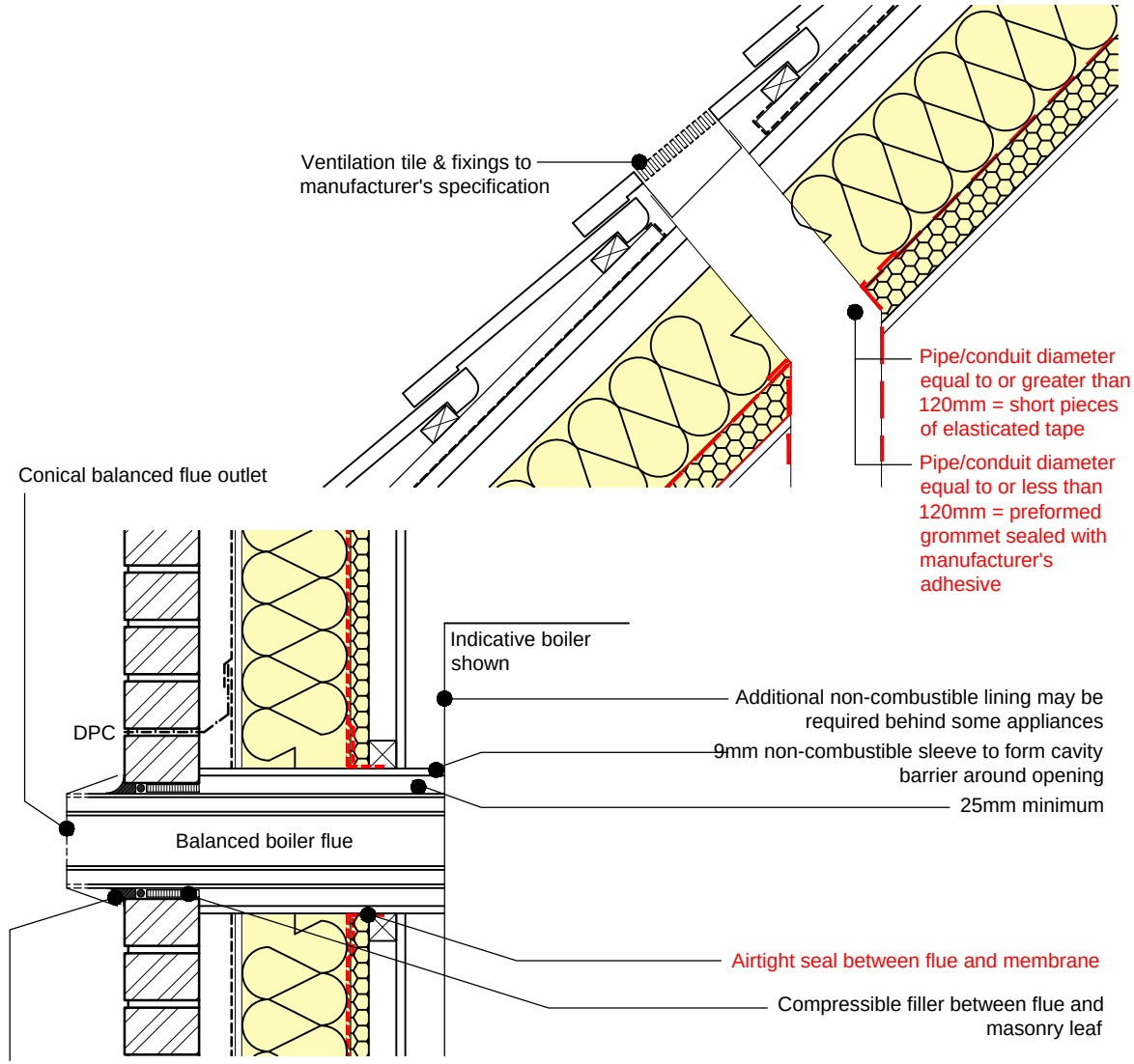
1. Confirm routes of all incoming/outgoing services ducts, pipes, cables and flues at the site start.
2. Make sure all services trades are aware of the airtightness and insulation layers and that all holes or damage to them have to be repaired.
3. Use proprietary services collars/fittings where possible that have airtightness seals pre-installed.
4. Check that all collars or taped junctions are complete before installing the internal finishes.

General Arrangements

Service Penetrations: Floor & Party Wall Penetrations (Section view)

ACDs in support of 2015 energy standards

Detail 5.09



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 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
- Wall (cavity) - 4·00 (m²K)/W
- Wall (inner leaf) - 1·14 (m²K)/W

Critical features

1. Ensure that insulation is tightly fitted between the pipe/flue and any hole made through the floor or wall construction.

Airtightness checklist

1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.
2. Seal around any services penetration through the airtightness barrier using a flexible sealant or tape.

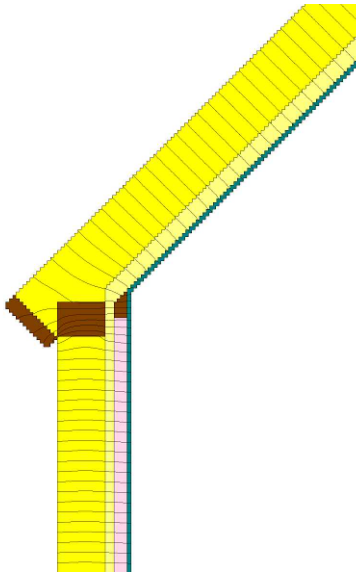
Additional advice

1. Confirm routes of all incoming/outgoing services ducts, pipes, cables and flues at the site start.
2. Make sure all services trades are aware of the airtightness and insulation layers and that all holes or damage to them have to be repaired.
3. Use proprietary services collars/fittings where possible that have airtightness seals pre-installed.
4. Check that all collars or taped junctions are complete before installing the internal finishes.

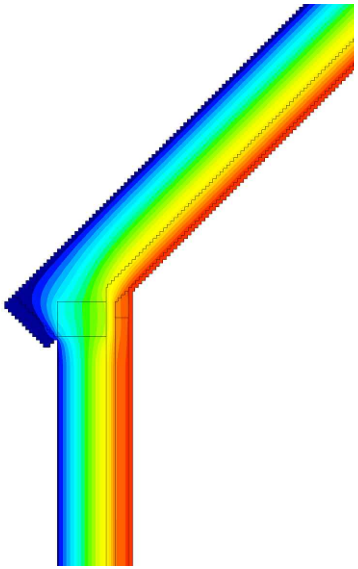
General Arrangements
Service Penetrations: Boiler & Roof Penetrations (Section view)

ACDs in support of 2015 energy standards

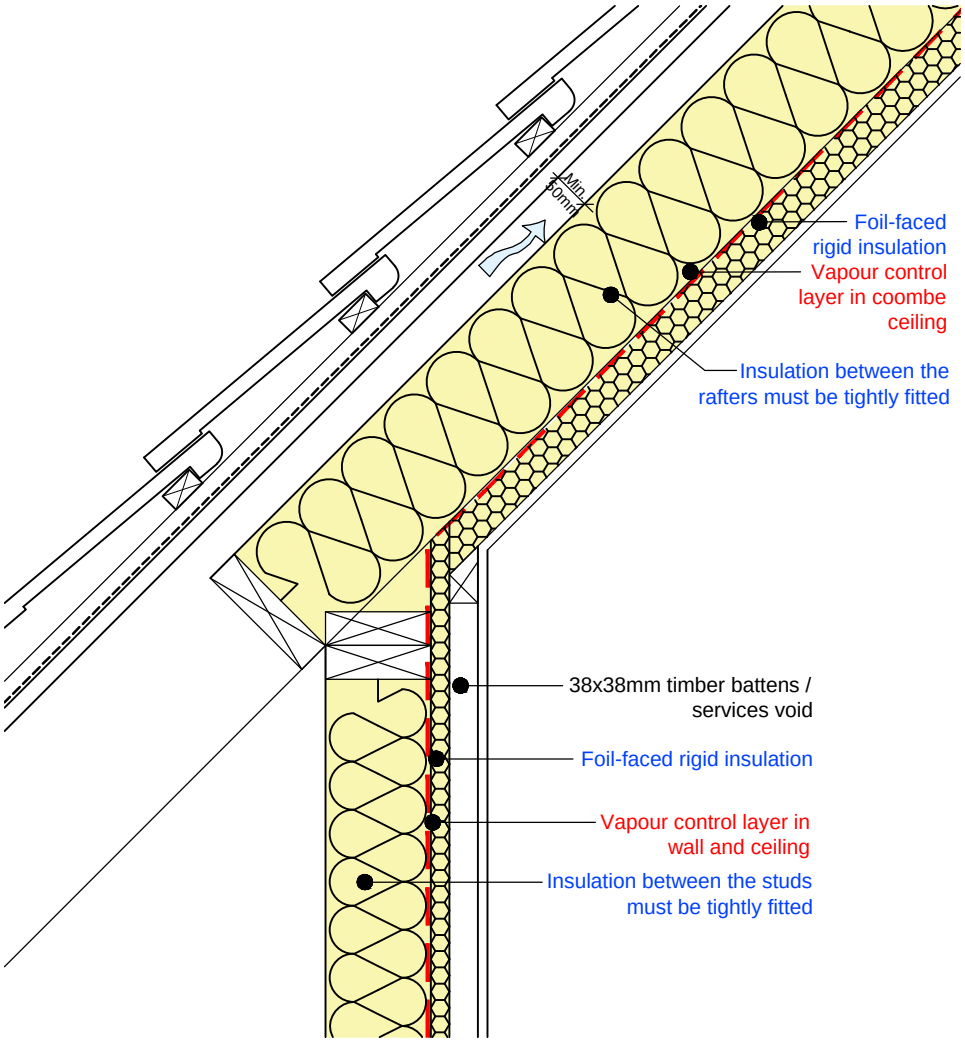
Detail 5.10



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:

- Roof (between rafters) - 6·48 (m²K)/W
- Roof (below rafters) - 2·27 (m²K)/W
- Wall (cavity) - 4·00 (m²K)/W
- Wall (inner leaf) - 1·14(m²K)/W

Critical features

1. Ensure that insulation is tightly fitted.
2. Ensure that insulation layers in roof are fitted perpendicularly to cover junctions between batts/rolls.
3. Ensure that roof insulation overlaps the timber wall frame forming wall of room within roof.

Airtightness checklist

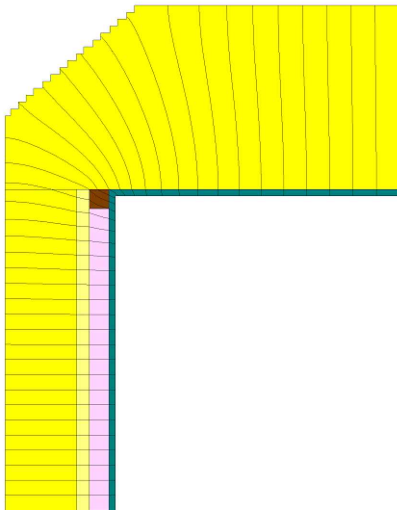
1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

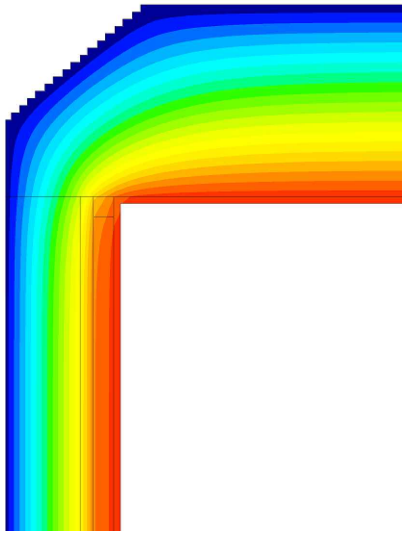
1. Check ventilation paths are clear before installing insulation above the ceiling.
2. Ventilation gap equivalent to 5 mm minimum continuous opening is required at ridge to batten space.
3. Ensure 50 mm air gap is maintained between rafters on sloping ceiling.

Ψ value = 0·020 W/m·K
Temp. factor = 0·97

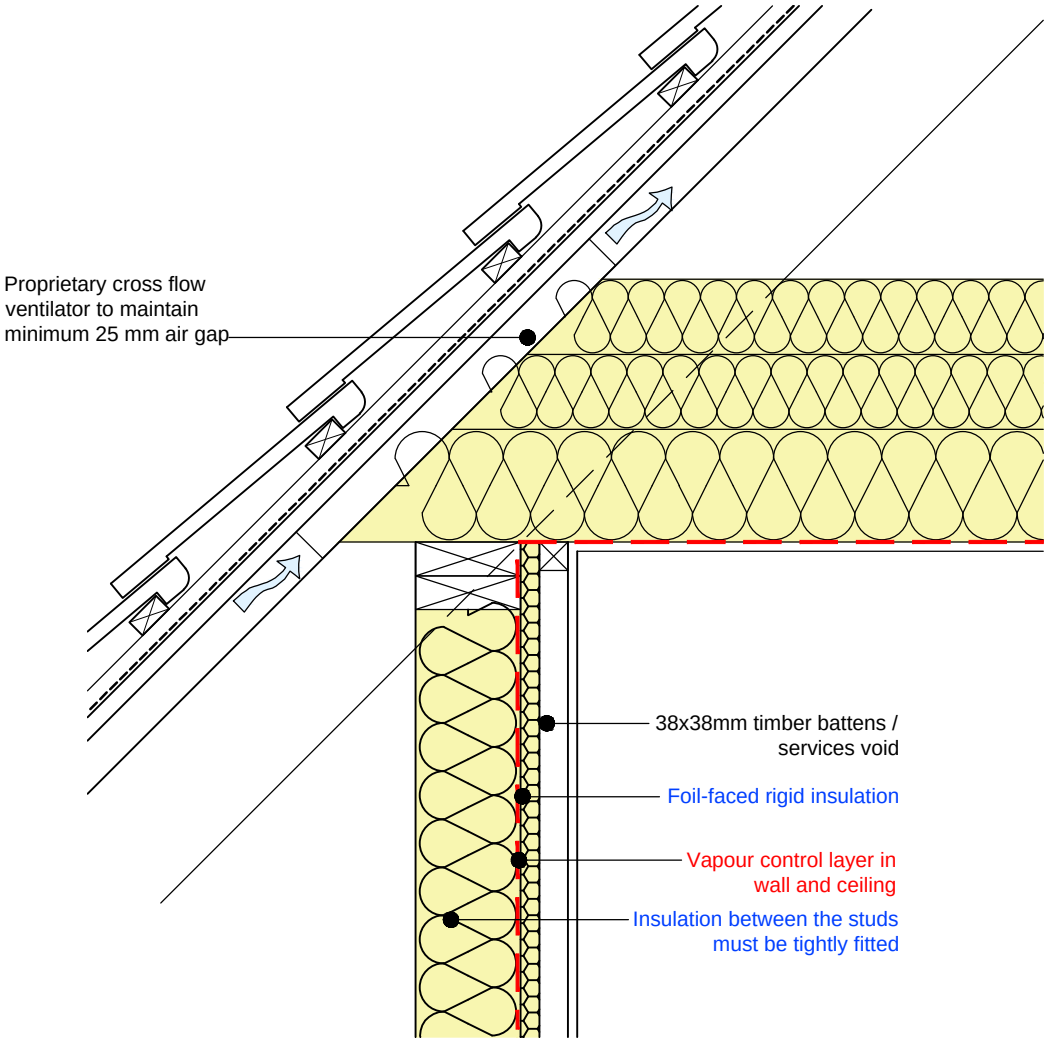
General Arrangements
Roof wall (rafter) (Section view)



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) - 4·00 (m²K)/W
Wall (inner leaf) - 1·14 (m²K)/W
Roof (flat ceiling) - 9·00 (m²K)/W

Critical features

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

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

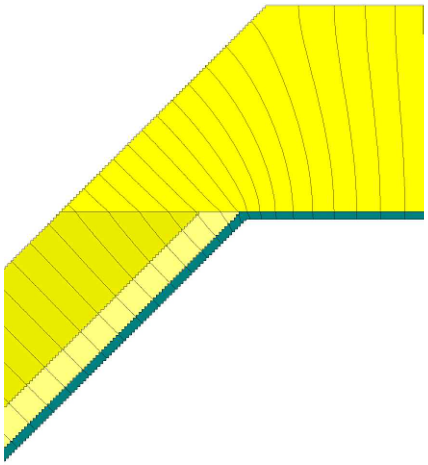
1. Check ventilation paths are clear before installing insulation above the ceiling.
2. Ventilation gap equivalent to 5 mm minimum continuous opening at ridge is required where the roof pitch is greater than 35° or the roof space is more than 10 m.

Ψ value = 0·048 W/m·K
Temp. factor = 0·93

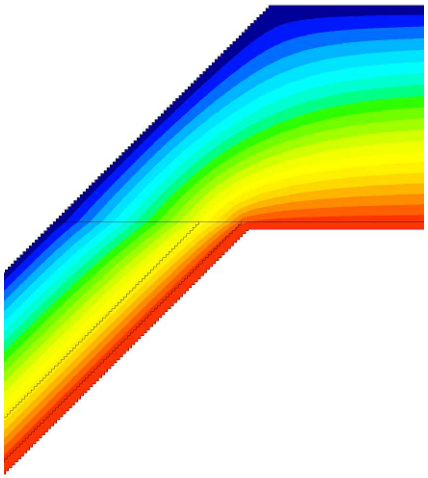
General Arrangements
Flat ceiling (Section view)

ACDs in support of 2015 energy standards

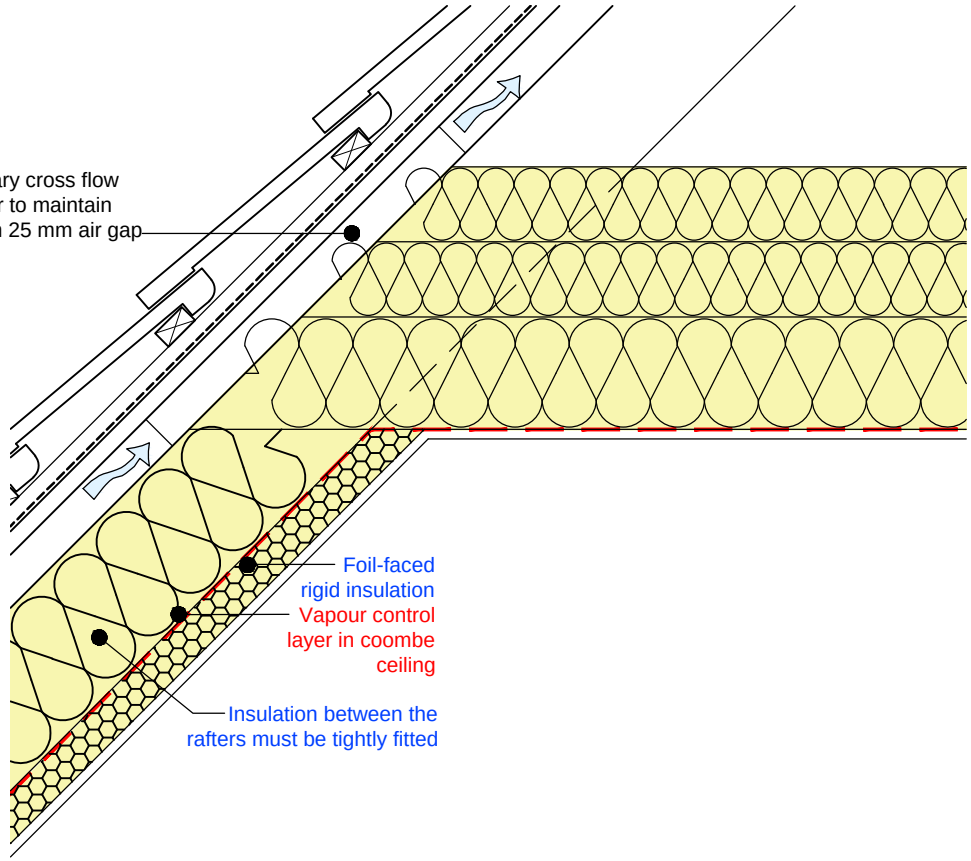
Detail 5.13 (R9)



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:

Roof (between rafters) - 6·48 (m²K)/W
Roof (below rafters) - 2·27 (m²K)/W
Roof (flat ceiling) - 9·00 (m²K)/W

Critical features

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

Airtightness checklist

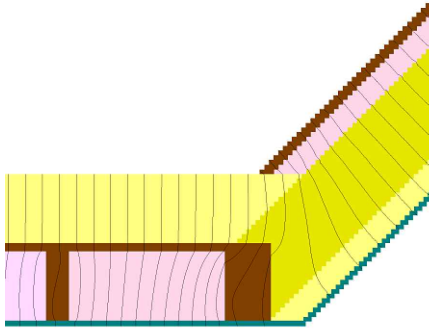
1. Check that any air tightness barrier used in junctions to wall, floor, ceiling or opening is robustly lapped and taped.

Additional advice

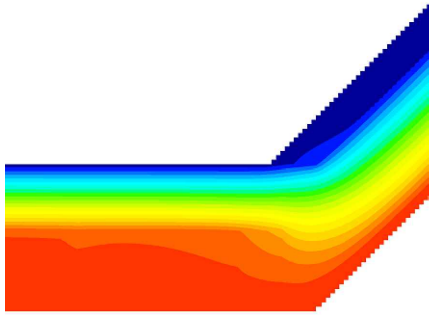
1. Check ventilation paths are clear before installing insulation above the ceiling.
2. Ventilation gap equivalent to 5 mm minimum continuous opening is required at ridge to batten space.
3. Ensure 50 mm air gap is maintained between rafters on sloping ceiling.

Ψ value = 0·038 W/m·K
Temp. factor = 0·97

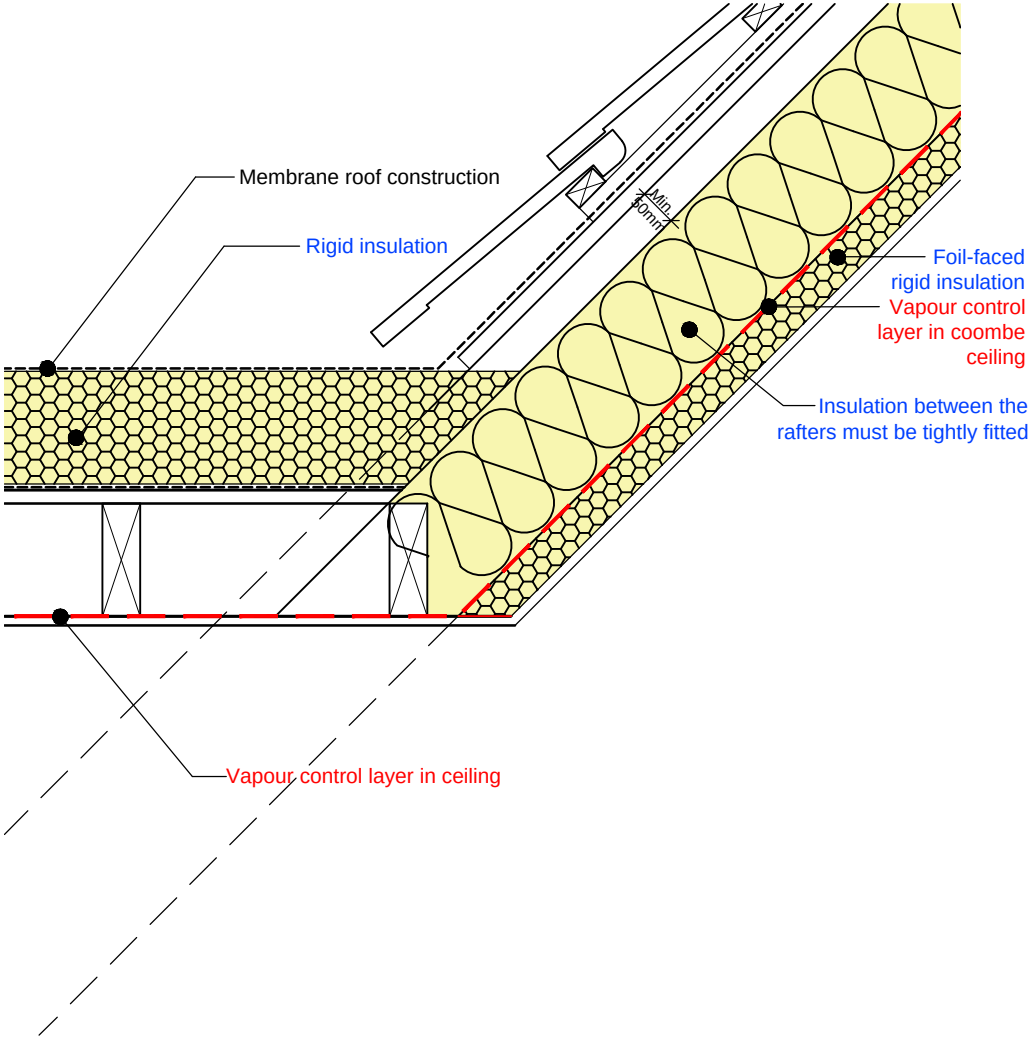
General Arrangements
Flat ceiling (Section view)



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:

Sloping roof:
(between rafters) - 6·48 (m²K)/W
(below rafters) - 2·27 (m²K)/W
Flat roof:
(above deck) - 6·82 (m²K)/W

Critical features

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

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. Ventilation gap equivalent to 5 mm minimum continuous opening is required at ridge to batten space.
2. Ensure 50 mm air gap is maintained between rafters on sloping ceiling.

Ψ value = -0·020 W/m·K
Temp. factor = 0·98

General Arrangements
Flat ceiling (inverted) (Section view)