# Guidance on timber roof trusses in dwellings

To assist our customers, please find enclosed a copy of a recent circular prepared by the Department of Housing Planning and Local Government on this topic. Part B - Fire Safety was revised in 2017 to include provisions specifically for dwelling houses. Technical Guidance Document B Volume 2 - Dwelling houses (TGD B - Fire Safety Volume 2 Dwelling Houses 2017) was published in 2017 to support Part B and to give guidance on prima facie compliance with the regulations.

The enclosed circular has been distributed by the Department via the Building Control Management System (BCMS) reference: *01/2020 - 2020 Guidance on Timber Roof Trusses in Dwellings* and is intended to appear as supplementary guidance alongside Technical Guidance Document B - Fire Safety - Volume 2 Dwelling Houses (2017)

TRA would like to draw your attention to the following important extracts:

*"Roofs are a structural element and their design should be in accordance with the Eurocodes. The fire resistance of the roof, where there is a requirement, must be proven by test to the European Test method, EN 1365 (series) Fire resistance tests for load bearing elements."*

*"The fire resistance of any such roof is a result of the combination of the design, the materials used (trusses, noggins, linings etc.), including their thickness, spacing and fixing of the materials i.e. the build up, together with the workmanship employed during assembly."*

*"Typically, there are three scenarios where the truss roof may need fire resistance:*

*"1. Where there is a requirement for a protected corridor, such as in a dwelling house with three or more storeys, a truss roof must form part of a fire resistant construction, as failure of the truss would compromise the protected escape route.*

*"2. Where 'Attic' type trusses, commonly called dormer trusses are forming the floor in the dormer area, the floor formed by the truss is required to have a fire resistance. The required fire resistance will depend on the height of the floor above ground level i.e. R 30, REI 15 or REI 30. As the integrity of the truss depends on all elements remaining intact, the fire resistance required for the floor will also apply to the walls and ceiling in the dormer area as well as the ceiling below the dormer area.*

*"3. Where a roof serves as an escape route from an upper storey, the roof must have a fire resistance from the underside.*

*"The fire tested roof build-ups involved load bearing timber trusses of different chord and web thicknesses, affixed with varying combinations of single or double plasterboard slabs, with and without battens or noggins.*

*"Roof build-ups, which met a fire resistance of 30 minutes (REI 30), by fire test are detailed below."*

The different fire tested configurations are illustrated in the guidance with diagrams Roof Type (RT1) through to Roof Type (RT6).

In addition to the above, we would like to note that for diagram RT 5 the minimum 35mm bottom chord dimension is for the purpose of fire testing. For structural design purposes the thickness for attics truss chords will be greater at 44 or 47mm dependent upon the design and truss spacing.

## Introduction

Part B - Fire Safety was revised in 2017 to include provisions specifically for dwelling houses. Technical Guidance Document B Volume 2 - Dwelling houses (TGD B - Fire Safety Volume 2 Dwelling Houses 2017) was published in 2017 to support Part B and to give guidance on prima facie compliance with the regulations.

Where buildings are designed in accordance with the Eurocodes, the fire performance specified (where required), of structural elements must be demonstrated in accordance with the European test methods.

Roofs are a structural element and their design should be in accordance with the Eurocodes. The fire resistance of the roof, where there is a requirement, must be proven by test to the European Test method, EN 1365 (series) *Fire resistance tests for load bearing elements.*

Roofs should have a fire resistance appropriate to their use and must be considered against various criteria in relation to their fire resistance for standard fire exposure. These are:

- **R** – mechanical resistance i.e. an ability to maintain loadbearing capacity
- **E** – integrity i.e. an ability to maintain the integrity of the structure
- **I** – insulation i.e. an ability to provide insulation from high temperatures.

The fire resistance of any such roof is a result of the combination of the design, the materials used (trusses, noggins, linings etc.), including their thickness, spacing and fixing of the materials i.e. the build up, together with the workmanship employed during assembly.

The Truss Rafter Association, the Irish Timber Frame Manufacturers Association and the Timber Frame Industry commissioned fire tests on a variety of build-ups on timber truss roofs. These fire tests were carried out in accredited laboratories in accordance with the appropriate European Test method for load bearing elements. The fire tested roof build-ups involved load bearing timber trusses of different chord and web thicknesses, affixed with varying combinations of single or double plasterboard slabs, with and without battens or noggins.

Roof build-ups, which met a fire resistance of 30 minutes (REI 30), by fire test are detailed below.

## Requirement for fire resistant construction in truss roofs

TGD B 2017, Diagram 11 provides two options for protecting the escape stairway. Truss design requires that all the elements of the truss (chord and web members) are intact in order to maintain the integrity of the whole truss. As such, Option 11(b) (fire resisting ceiling) is the appropriate solution for a trussed roof design.

Where there is a fire requirement, it applies from the habitable area. This would typically be from the underside of the bottom chord of the truss roof, but in the case of a dormer roof, this would also be from the habitable area in the attic.

Typically, there are three scenarios where the truss roof may need fire resistance:

1. Where there is a requirement for a protected corridor, such as in a dwelling house with three or more storeys, a truss roof must form part of a fire resistant construction, as failure of the truss would compromise the protected escape route.

2. Where "Attic" type trusses, commonly called dormer trusses are forming the floor in the dormer area, the floor formed by the truss is required to have a fire resistance. The required fire resistance will depend on the height of the floor above ground level i.e. R 30, REI 15 or REI 30. As the integrity of the truss depends on all elements remaining intact, the fire resistance required for the floor will also apply to the walls andceiling in the dormer area as well as the ceiling below the dormer area.

3. Where a roof serves as an escape route from an upper storey, the roof must have a fire resistance from the underside.

## Fire resistant roof build-ups with penetrations

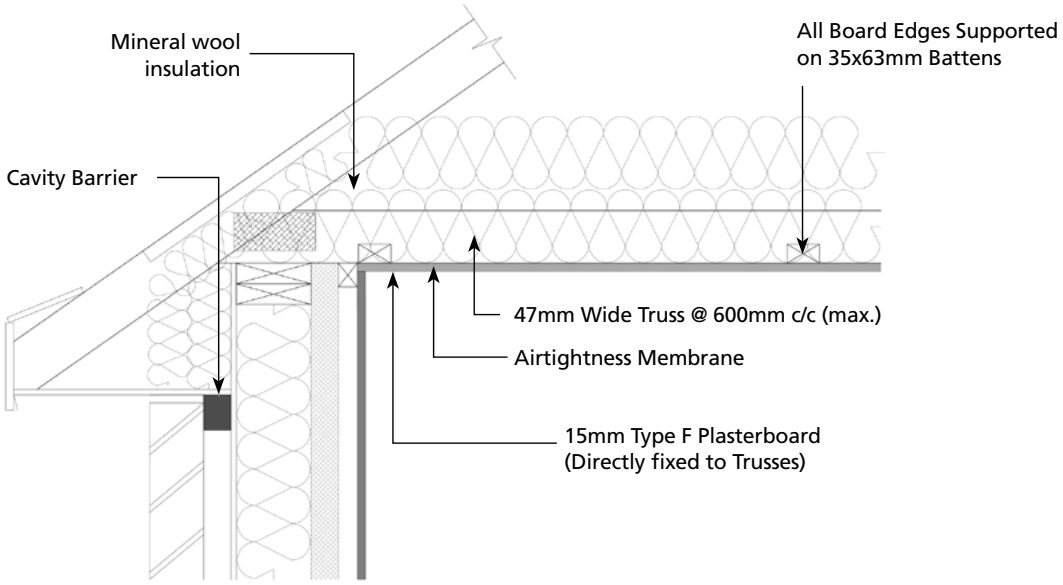
All penetrations, such as sockets, switches, down-lighters, soil vent pipes, ventilation duct heads, etc., in the plasterboard "creates" vulnerability in the fire resistant construction and as such must be fire stopped by the use of fire collars, fire hoods or fire rated products. An exception to this requirement is sockets or switches in the vertical wall section of a dormer roof truss.

The provision of a service void below an imperforate ceiling in any roof may avoid the need for fire stopping (see figure 2 (a) and 2 (b)).

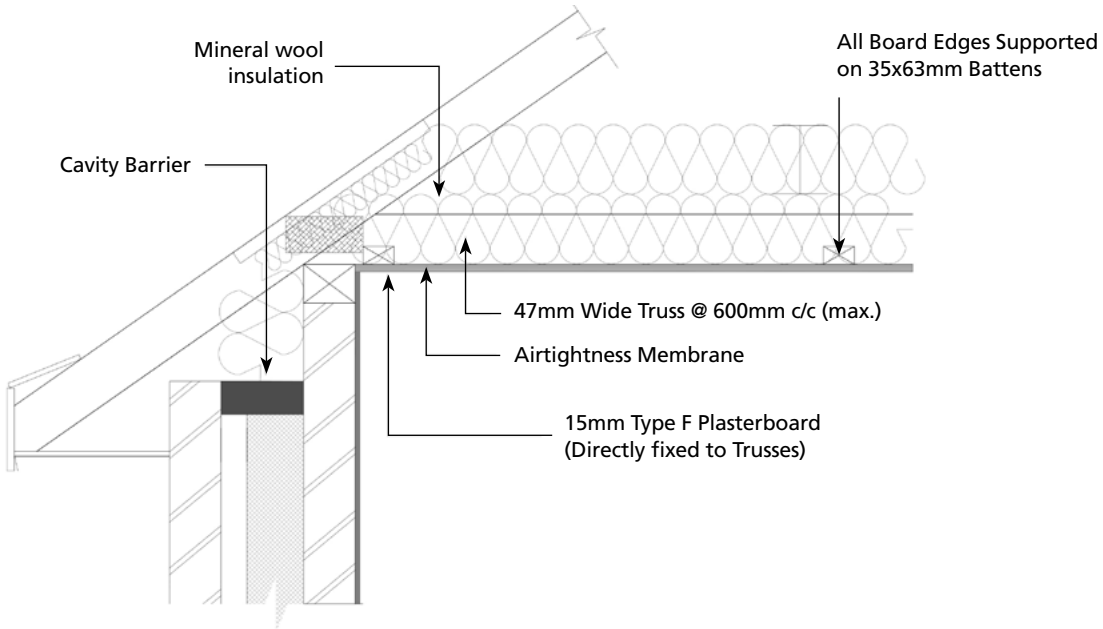
**Note:** Where loadbearing studs are used to support a truss roof, the stud must also have the same fire resistance as required for the truss.

## Roof Type 1 (RT 1) - 47mm Truss

DIAGRAMS
NOT TO SCALE




**Section**
**Figure 1(a) Roof with 47mm wide Trusses on timber frame wall**



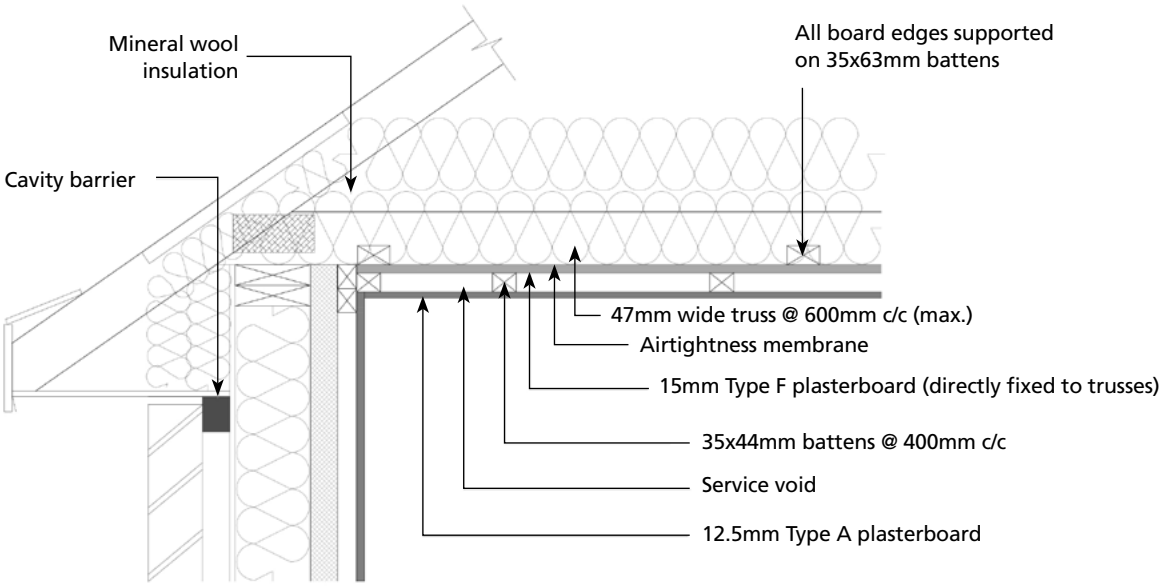

**Section**
**Figure 1(b) Roof with 47mm wide Trusses on masonry wall**

## NOTE

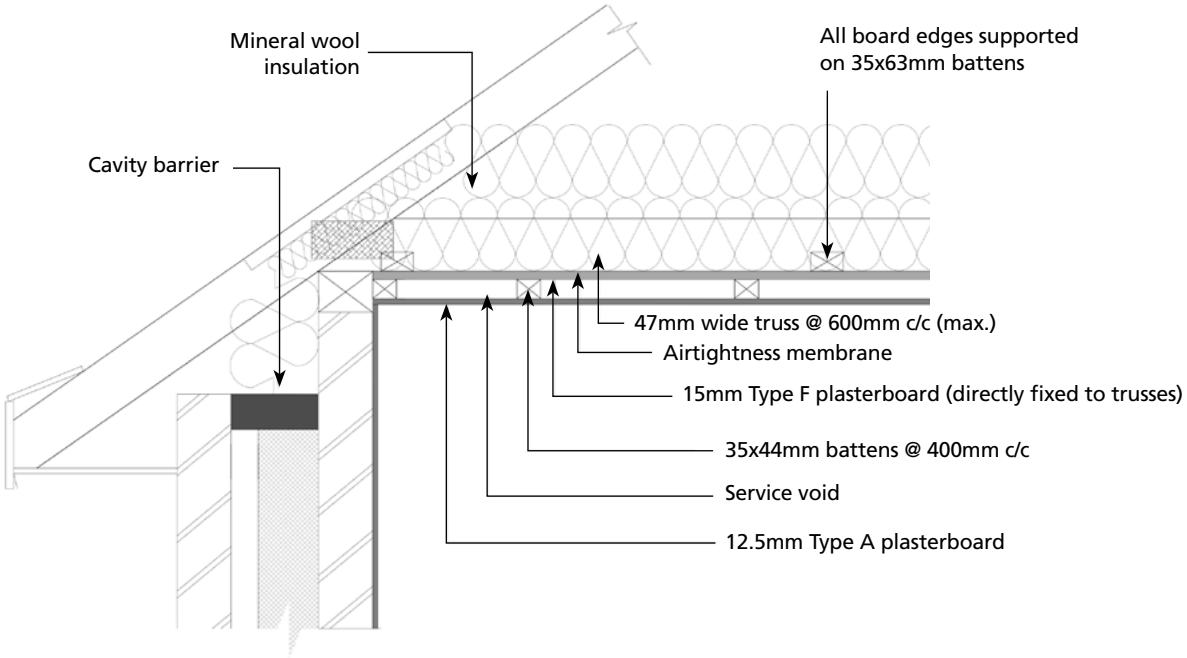
All penetrations to be firestopped

## Roof Type 2 (RT 2) - 47mm Truss

DIAGRAMS
NOT TO SCALE




**Section**
**Figure 2(a) Roof with 47mm wide Trusses with service void under on timber frame wall**



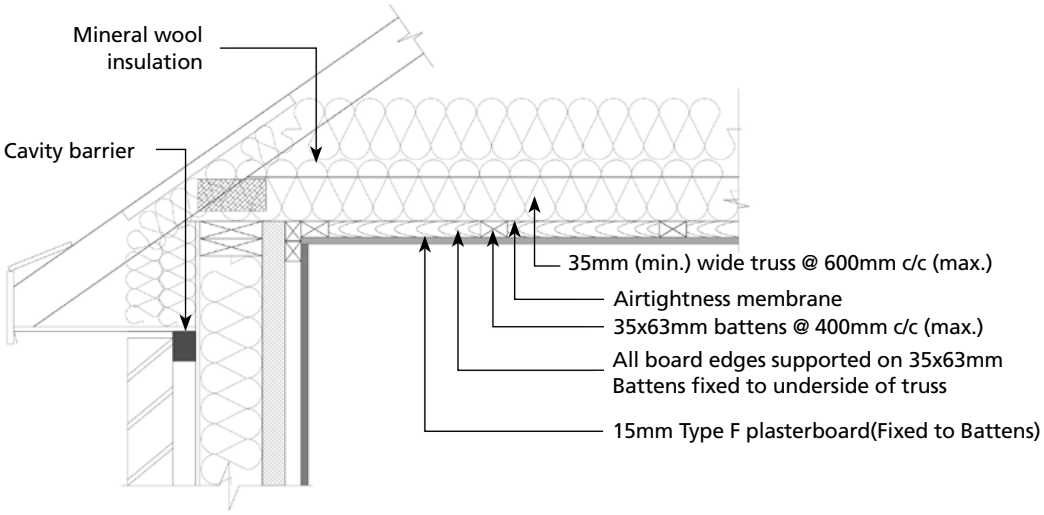

**Section**
**Figure 2(b) Roof with 47mm wide Trusses with service void under on masonry wall**

## NOTE

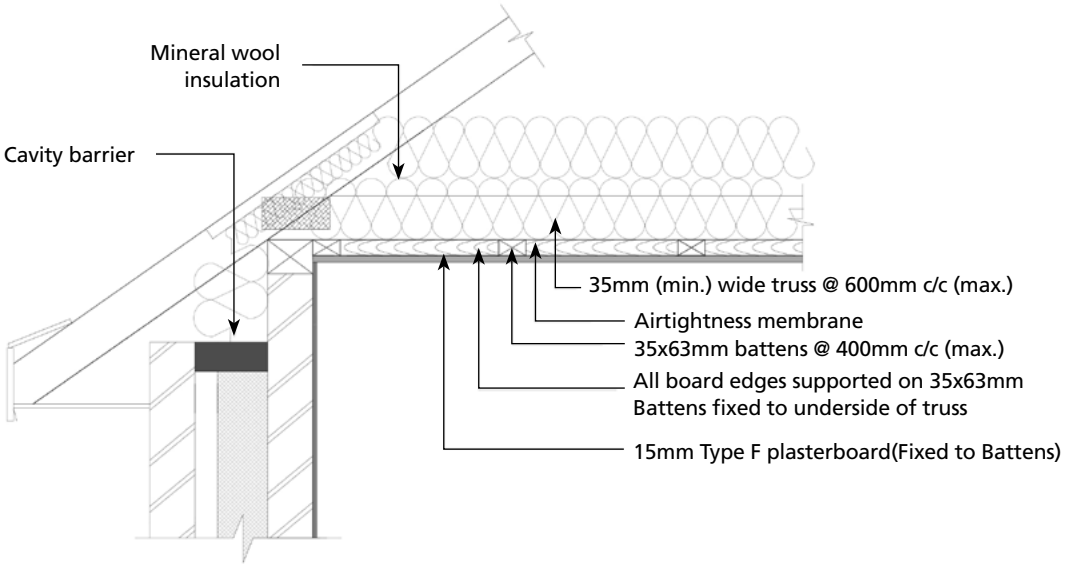
No penetrations to Type F plasterboard (unless firestopped)

## Roof Type 3 (RT 3) - 35mm Truss

DIAGRAMS
NOT TO SCALE




**Section**
**Figure 3(a) Roof with 35mm wide Trusses on timber frame wall**



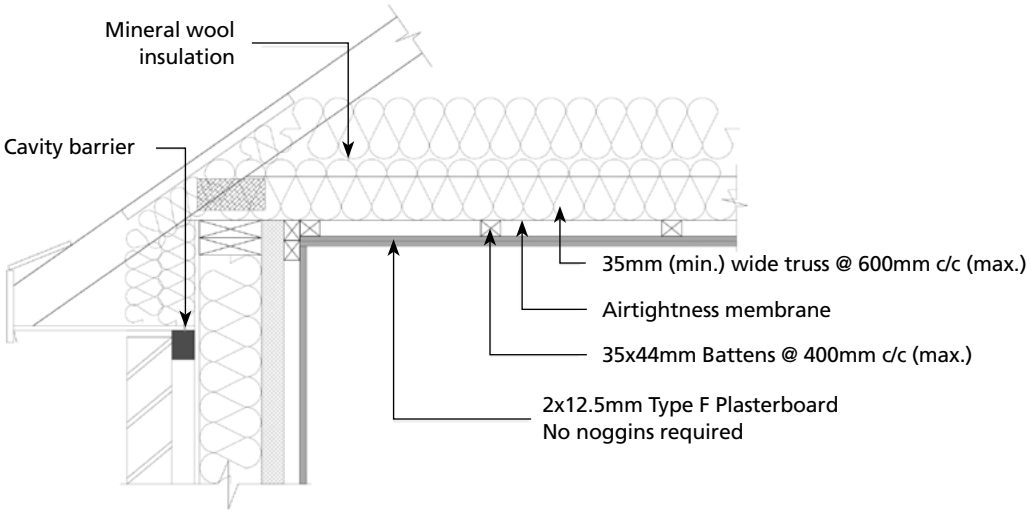

**Section**
**Figure 3(b) Roof with 35mm wide Trusses on masonry wall**

## NOTE

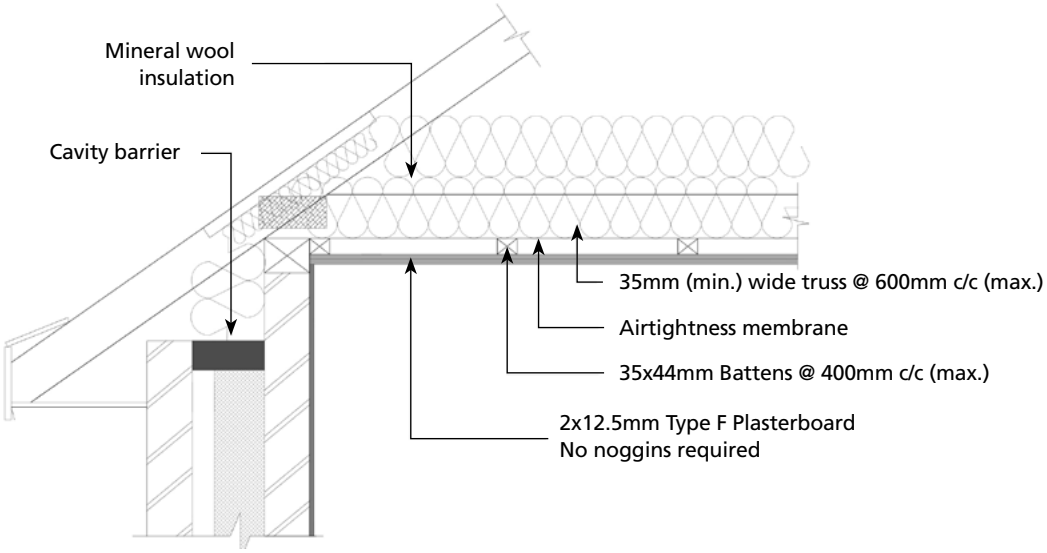
All penetrations to be firestopped

## Roof Type 4 (RT 4) - 35mm Truss

DIAGRAMS
NOT TO SCALE




**Section**
**Figure 4(a) Roof with 35mm wide Trusses on timber frame wall**



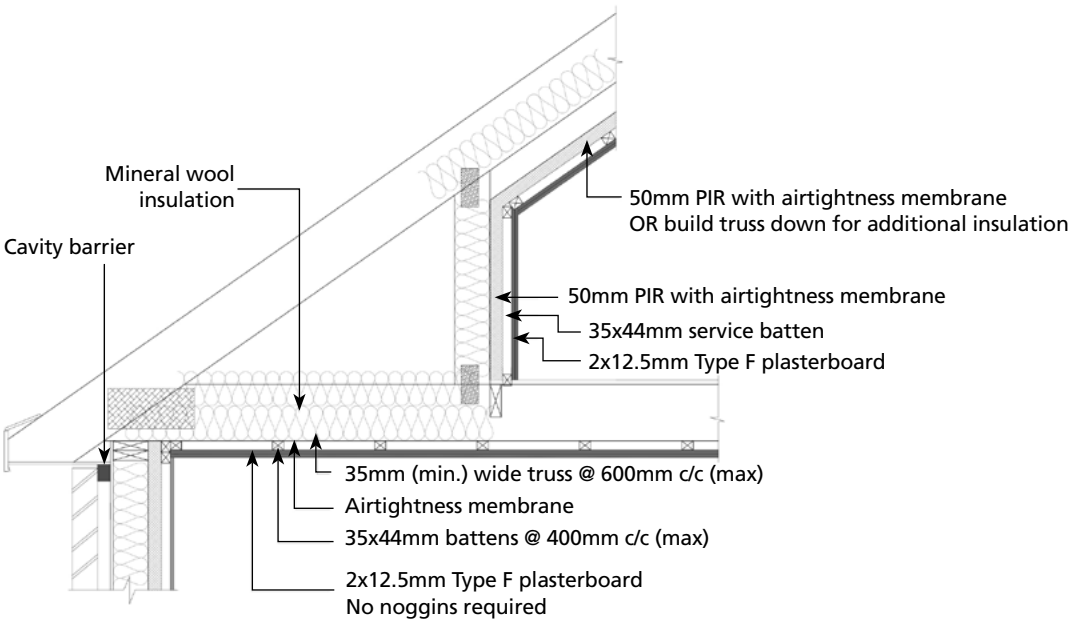

**Section**
**Figure 4(b) Roof with 35mm wide Trusses on masonry wall**

## NOTE

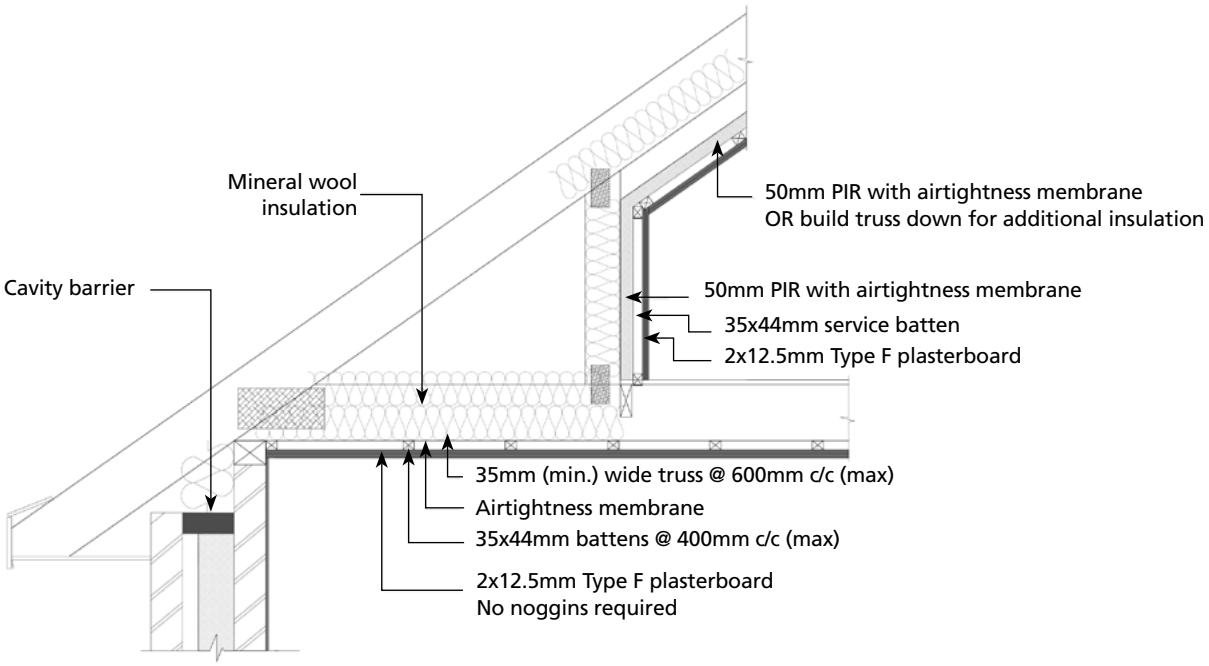
All penetrations to be firestopped

## Roof Type 5 (RT 5) Dormer - 35mm Truss

DIAGRAMS
NOT TO SCALE




**Section**
**Figure 5(a) Dormer roof with 35mm wide Truss on timber frame wall**



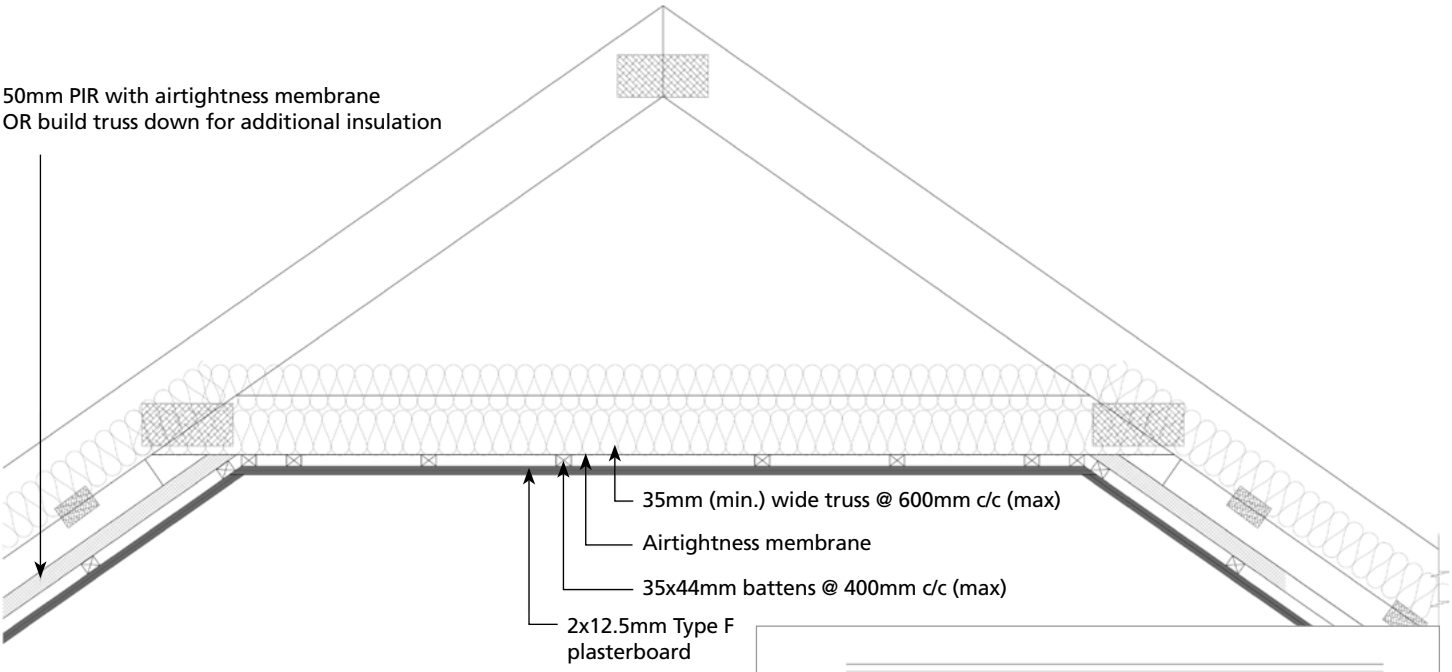

**Section**
**Figure 5(b) Dormer roof with 35mm wide Truss on masonry wall**

## NOTE

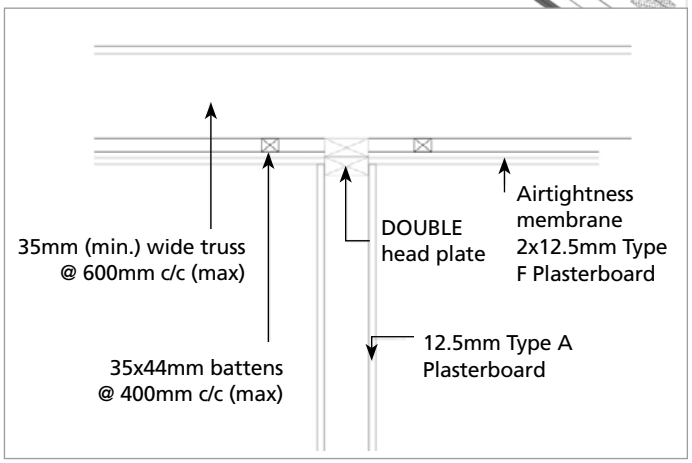
All penetrations to be firestopped

## Roof Type 5 (RT 5) Dormer - 35mm Truss

DIAGRAMS
NOT TO SCALE




**Section**
**Figure 5(c) Dormer roof with 35mm wide Truss**



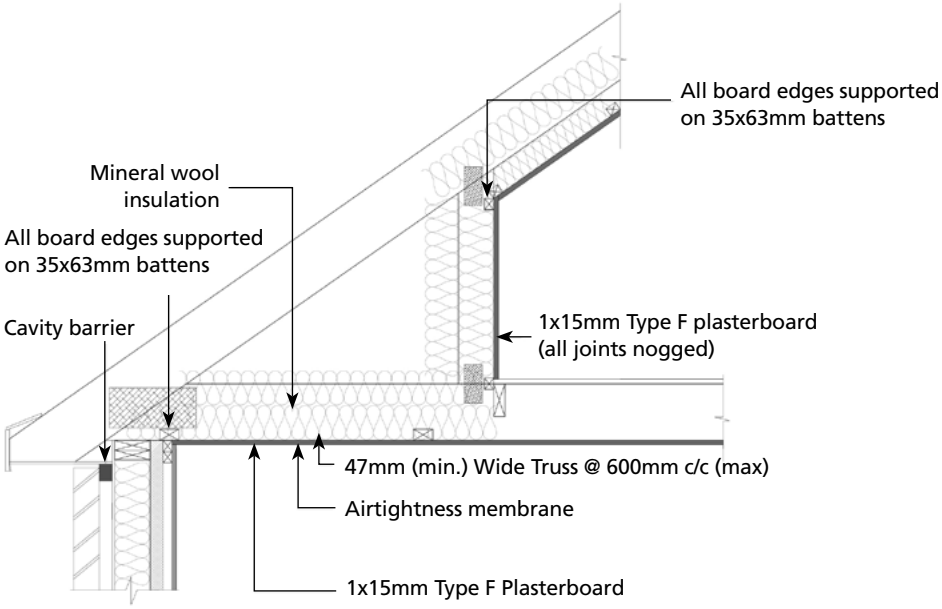

**Section**
**Load Bearing internal stud**

## NOTE

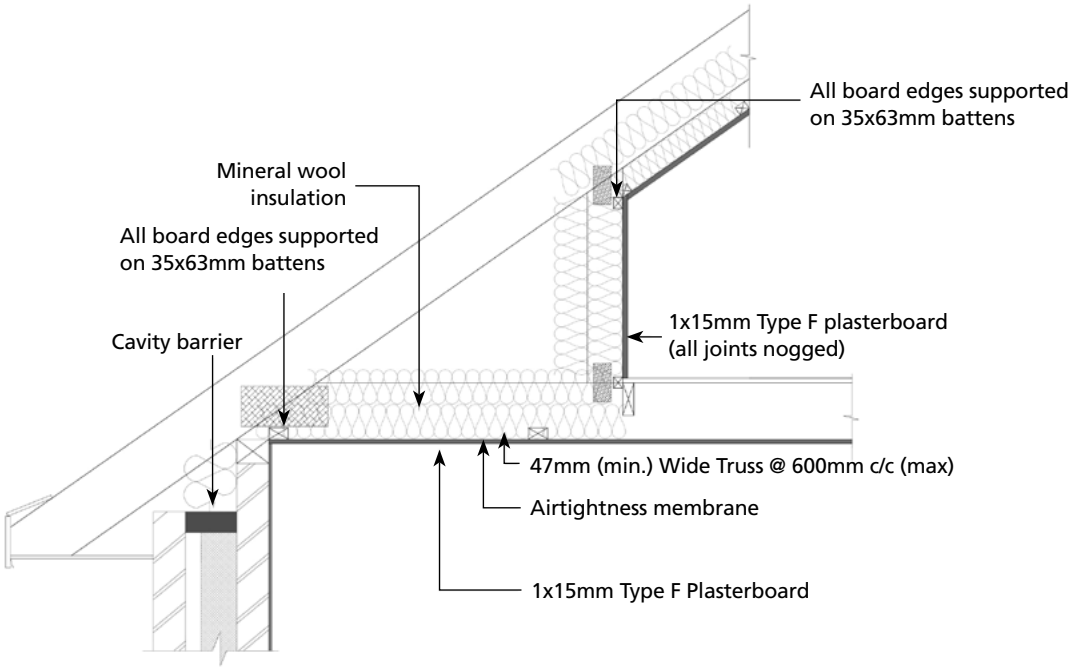
All penetrations to be firestopped

## Roof Type 6 (RT 6) Dormer - 47mm Truss

DIAGRAMS
NOT TO SCALE




**Section**
**Figure 6(a) Dormer roof with 47mm wide Truss on timber frame wall**



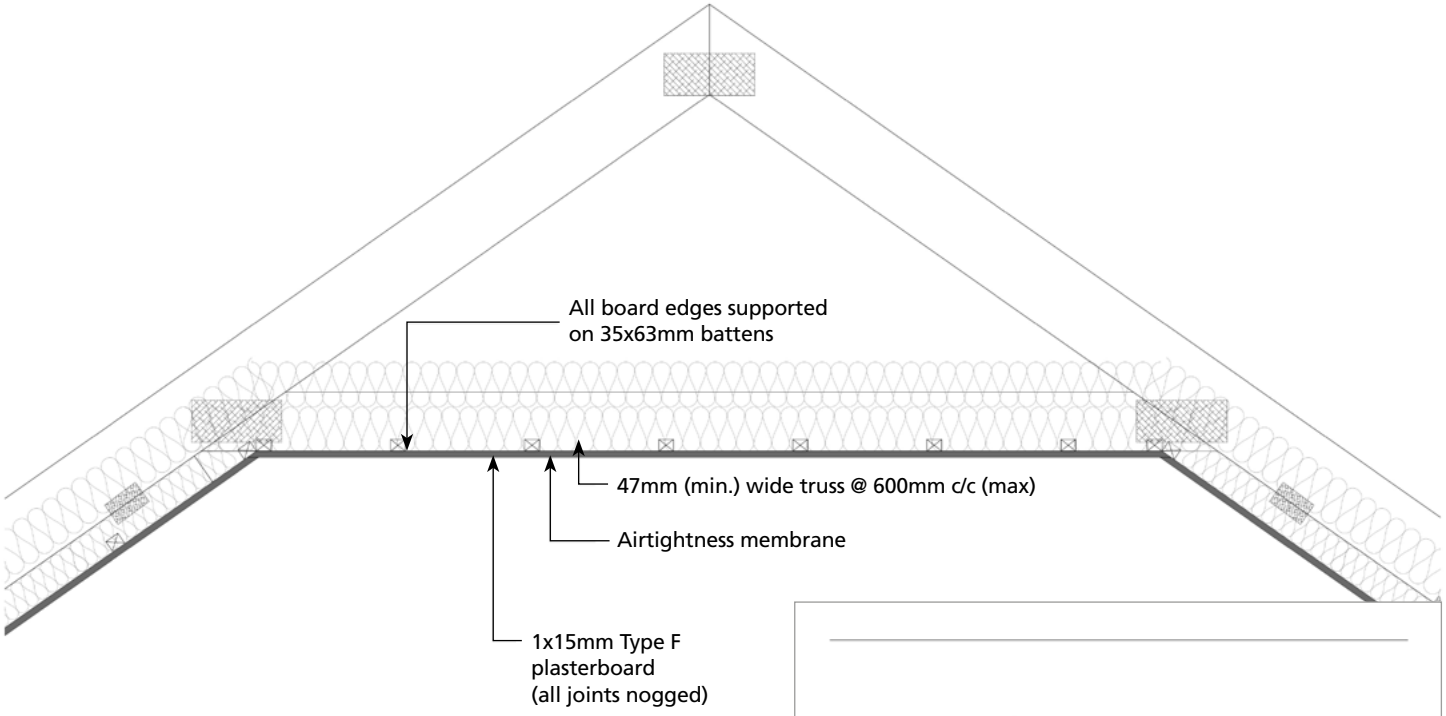

**Section**
**Figure 6(b) Dormer roof with 47mm wide Truss on masonry wall**

## NOTE

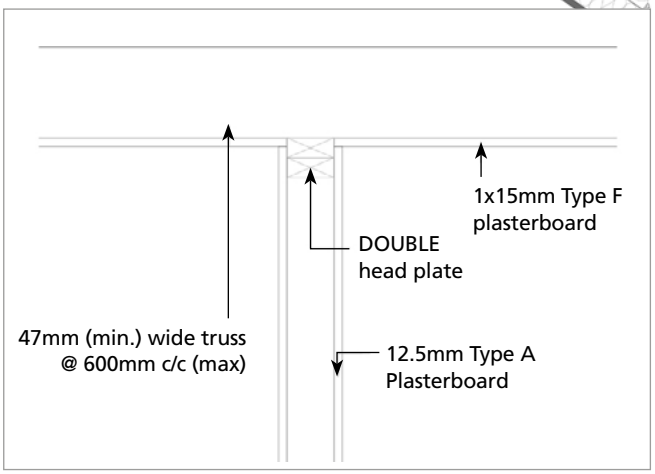
All penetrations to be firestopped

## Roof Type 6 (RT 6) Dormer - 47mm Truss

DIAGRAMS
NOT TO SCALE




**Section**
**Figure 5(c) Dormer roof with 35mm wide Truss**




**Section**
**Load Bearing internal stud**

## NOTE

All penetrations to be firestopped