

# Provision of fire resistance for trussed rafter roofs on 'single occupancy' dwellings

## Requirements for fire resistance of trussed rafter roofs when tested in accordance with BS EN 1365-2 or BS476-21

As laid out in the various Building Regulations of the United Kingdom, certain forms of trussed rafter roof, as summarised in table 1, are required to provide a period of fire resistance during which time the following criteria are to be met:

**Load-bearing capacity** (denoted R in the European classification) being the resistance to collapse or to excessive deflection of the roof structure.

**Integrity** (denoted E in the European classification) being the resistance to fire penetration through the roof structure.

**Insulation** (denoted I in the European classification) being the resistance to the transfer of excessive heat across the roof structure.

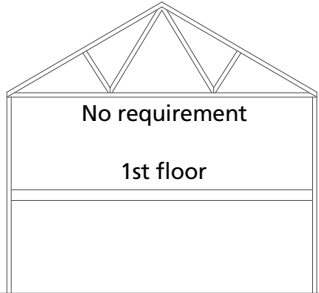
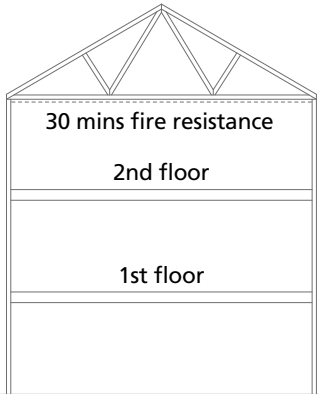
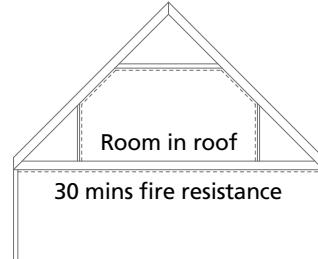
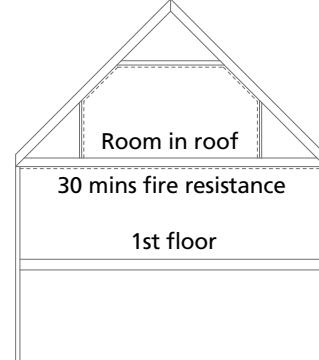
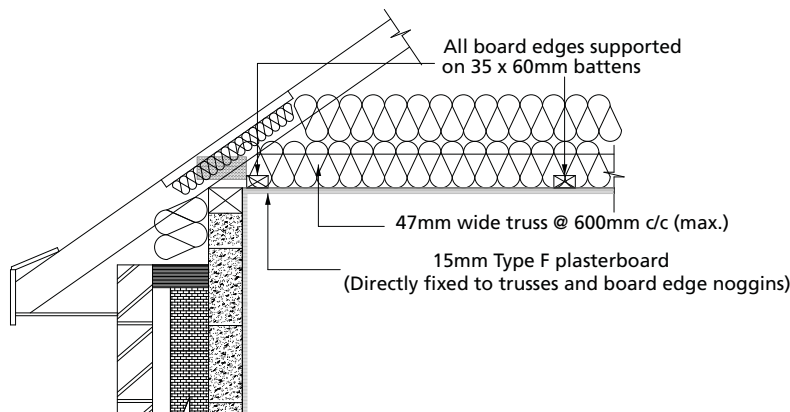
Requirements for fire resistance			
			
<p><b>No fire resistance required.</b></p> <p>An exception to this is if the roof provides a means of escape during a fire.</p>	<p><b>EI 30.</b></p> <p>Fire resistance applies to whole ceiling unless stairwell is compartmentalised (refer to paragraph 2.5 and diagram 2.3 of Approved Document B).</p>	<p><b>R 30 and REI 15.</b></p> <p>Fire resistance required for:</p> <ul style="list-style-type: none"> <li>• Exposure to fire from underside of attic truss bottom chord ceiling</li> <li>• Exposure to fire from within room-in roof [i.e. walls, ceiling and sloping ceiling].</li> </ul>	<p><b>REI 30.</b></p> <p>Fire resistance required for:</p> <ul style="list-style-type: none"> <li>• Exposure to fire from underside of attic truss bottom chord ceiling</li> <li>• Exposure to fire from within room-in-roof [i.e. walls, ceiling and sloping ceiling].</li> </ul>

Table 1 – Fire resistance requirements for trussed rafter roofs on dwellings

Trussed rafter ceiling constructions that provide 30 minutes fire resistance (REI 30)

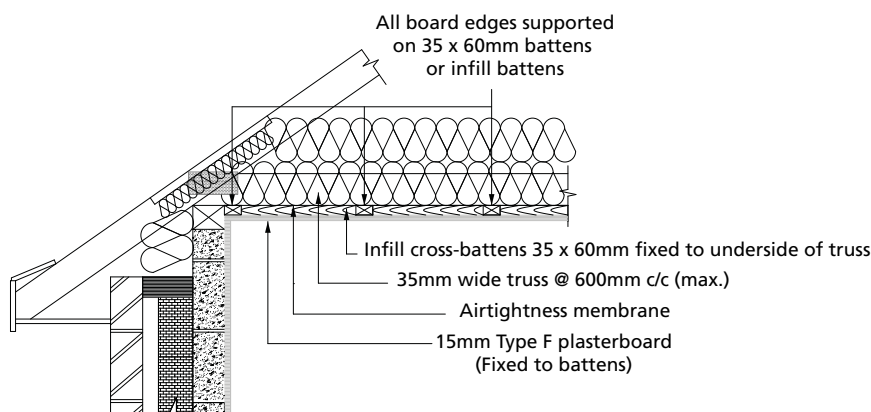
**No overlying floor deck & 47mm trusses**

- 47mm minimum truss thickness
- Trusses at maximum of 600mm centres
- **Board edge noggins (minimum size of 35mm x 60mm) at room perimeter and all plasterboard edges.**
- 15mm Type F plasterboard fixed to truss bottom chords and noggins using 3.5mm diameter drywall screws of 42mm minimum length at 150mm centres.
- 300mm glasswool insulation between and over truss bottom chord



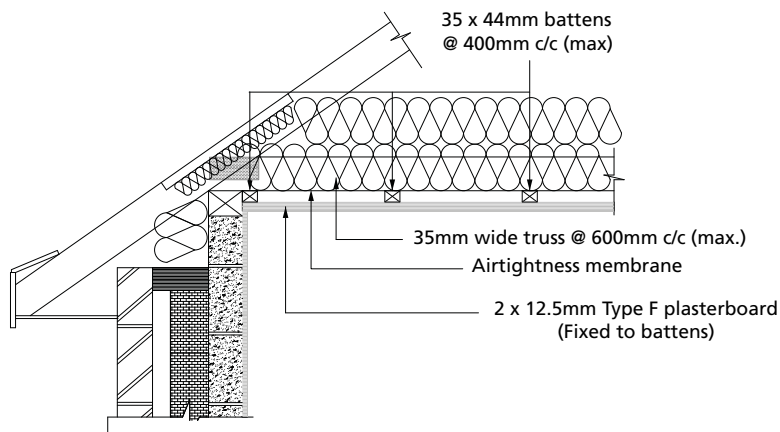
**No overlying floor deck & 35mm trusses – option 1**

- 35mm minimum truss thickness
- Trusses at maximum of 600mm centres
- Air tight membrane to underside of trusses
- Counter-battens (minimum size of 35mm x 60mm) nailed to underside of trusses at 400mm centres. Infill cross-battens (minimum size of 35mm x 60mm) directly under trusses at room perimeter and unsupported plasterboard edges.
- 15mm Type F plasterboard fixed to counter-battens and cross-battens using 3.5mm diameter drywall screws of 42mm minimum length at 150mm centres.
- 300mm glasswool insulation between and over truss bottom chords



**No overlying floor deck & 35mm trusses – option 2**

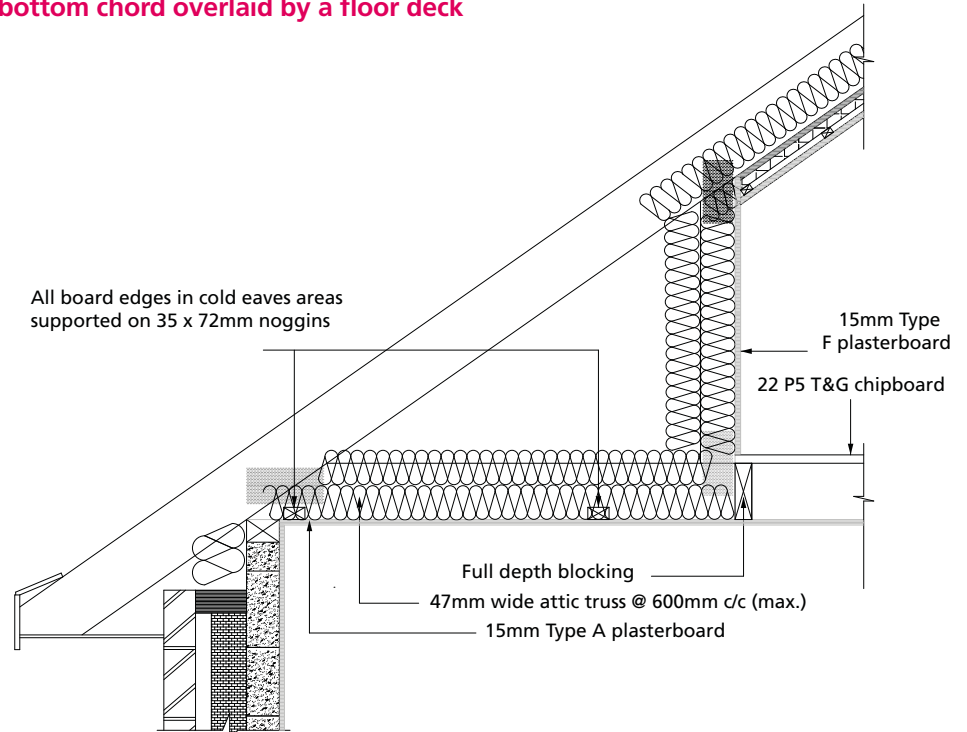
- 35mm minimum truss thickness
- Trusses at maximum of 600mm centres
- Air tight membrane to underside of trusses
- Counter-battens (minimum size of 35mm x 44mm) nailed to underside of trusses at 400mm centres. No cross-battens required.
- 2 layers of 12.5mm Type F plasterboard fixed to counter-battens using 42mm/55mm long 3.5mm diameter drywall screws at 150mm centres. Staggered board joints.
- 300mm glasswool insulation between and over truss bottom chords



Trussed rafter ceiling constructions that provide 30 minutes fire resistance (REI 30) - cont.

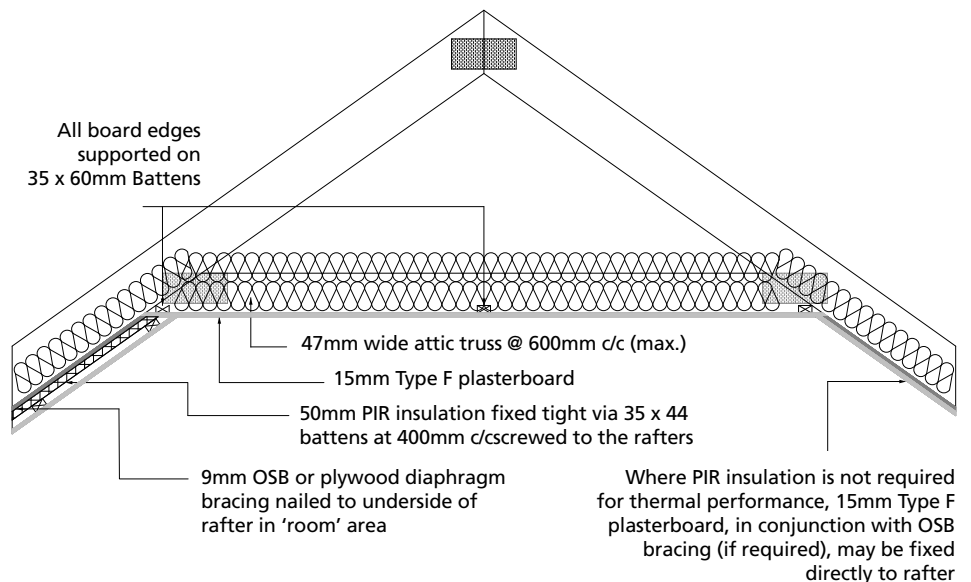
**47mm attic trusses with central part of bottom chord overlaid by a floor deck**

- 47mm minimum truss thickness
- Trusses at maximum of 600mm centres
- **Full-depth blocking fitted on lines of inside edge of room-in-roof stub walls**
- Board edge noggins not required under room area, but in 'cold eaves' areas board edge noggins (minimum size of 35mm x 72mm) required at room perimeter and at any unsupported plasterboard edges
- 15mm Type A plasterboard fixed to truss bottom chords and noggins using 3.5mm diameter drywall screws of 42mm minimum length at 150mm centres
- 22mm T&G P5 chipboard floor deck glued and screwed to truss bottom chord in room area
- In 'cold eaves' areas 300mm glasswool insulation between and over truss bottom chords
- Board edge noggins (minimum size of 35mm x 60mm) required at all unsupported plasterboard edges in the side wall area



**Internal room members of attic trusses**

- 47mm minimum truss thickness
- Trusses at maximum of 600mm centres
- **Board edge noggins (minimum size of 35mm x 60mm) at perimeters and all plasterboard edges**
- 15mm Type F plasterboard fixed to truss members and noggins using 3.5mm diameter drywall screws of 42mm minimum length at 150mm centres
- 9mm OSB or plywood diaphragm bracing nailed to underside of rafter in 'room' area (no contribution towards fire resistance taken from OSB/plywood diaphragm so other bracing solutions are possible).
- Insulation as specified for project



**NOTE – All service penetrations [e.g. downlights, soil vent pipes, ventilation duct heads, etc.] in the plasterboard create vulnerability in the ceiling and as such must be fire-stopped by the use of fire collars, fire hoods or fire-rated products.**

### Supporting fire resistance test evidence

Fire resistance tests in accordance with EN1365-2, commissioned by either the Trussed Rafter Association (TRA) or the Irish Timber Frame Manufacturers Association (ITFMA), have been carried out on ceilings supported by loaded trussed rafters as listed in Table 2. There may be other forms of construction, which will provide the required fire resistance.

Details of fire test				Details of construction
Sponsor	Date of test	Laboratory	Report no.	
TRA	21/02/18	Warrington-Fire	393524	<ul style="list-style-type: none"> <li>• 47mm trusses at 600mm centres</li> <li>• 15mm Type F plasterboard</li> <li>• Plasterboard noggins at perimeter &amp; board edges</li> <li>• 300mm glasswool insulation.</li> </ul>
TRA	29/11/18	Peutz, Netherlands	Y-2028-3E-RA-001	<ul style="list-style-type: none"> <li>• 35mm trusses at 600mm centres</li> <li>• Air tight membrane</li> <li>• Counter-battens at 400mm centres and infill battens at perimeter &amp; board edges</li> <li>• 15mm Type F plasterboard</li> <li>• 300mm glasswool insulation.</li> </ul>
ITFMA	22/11/18	Warrington-Fire	406101	<ul style="list-style-type: none"> <li>• 35mm trusses at 600mm centres</li> <li>• Air tight membrane</li> <li>• Counter-battens at 400mm centres. No infill battens.</li> <li>• 2 no. 12.5mm Type F plasterboard</li> <li>• 300mm glasswool insulation.</li> </ul>
TRA	04/07/19	Peutz, Netherlands	Y-2117-3E-RA-001	<ul style="list-style-type: none"> <li>• 47mm attic trusses at 600mm centres</li> <li>• Full depth blocking under room stub walls</li> <li>• 15mm Type A plasterboard</li> <li>• Plasterboard noggins at perimeter &amp; board edges in 'cold eaves' areas</li> <li>• 22mm P5 chipboard deck in room area</li> <li>• 300mm glasswool insulation in 'cold eaves' areas.</li> </ul>
TRA	25/02/19	Warrington-Fire	Letter report dated 8/3/19	<ul style="list-style-type: none"> <li>• 47 x 194 timber joists</li> <li>• 150 mineral wool insulation between joists</li> <li>• 50 ecotherm foam under joists</li> <li>• 35 x 44 counter-battens screwed thro' foam insulation into joists</li> <li>• 15mm Type F plasterboard.</li> </ul>

Table 2 – Summary of supporting fire resistance test evidence