

ASFP Advisory Note 23

ASFP position on Secondary Steelwork

ASFP Advice on Protection of Secondary Steelwork

The definition for steelwork design may be regarded essentially in two parts whereby one is PRIMARY steelwork, and the other is deemed SECONDARY steelwork. Where fire protection measures are concerned this can be viewed as follows:

1. Primary Steelwork is classified as the main structural frame supporting the applied floor &/or roof loading. That is to say the main beams / columns / built-up frames / structural bracing etc, including INTERMEDIATE beams.
2. Secondary Steelwork is classified as the additional “secondary elements” required to provide additional rigidity or “non-structural” framing such as lightweight stability bracing / ties / cladding supports / door or window framing / wind posts etc.
As a simplistic approach, secondary members would, if they were removed, not compromise the overall structural stability of the structure, in other words the building would not collapse without them.

Project Design Teams and / or Structural Engineers are advised to review the various advisory documents that currently exist regarding the need for the provision of fire protection for secondary steelwork as classified above. This is not the responsibility of the fire protection installers nor manufacturers of fire protection systems.

Steel bracing members required to provide stability to the structure at the fire limit state should have adequate fire resistance unless alternative load paths can be identified.

The Steelwork Designer should be consulted to identify Primary Bracing versus Secondary Element Bracing as a visual review may not be sufficient. Where doubt exists, the assumption should be that the bracing is a Primary member and full protection provided.

Where fire protection to secondary bracing members is necessary, the protection thickness should be based on the section factor of the member or a value of 200 m^{-1} , whichever is the smaller value.

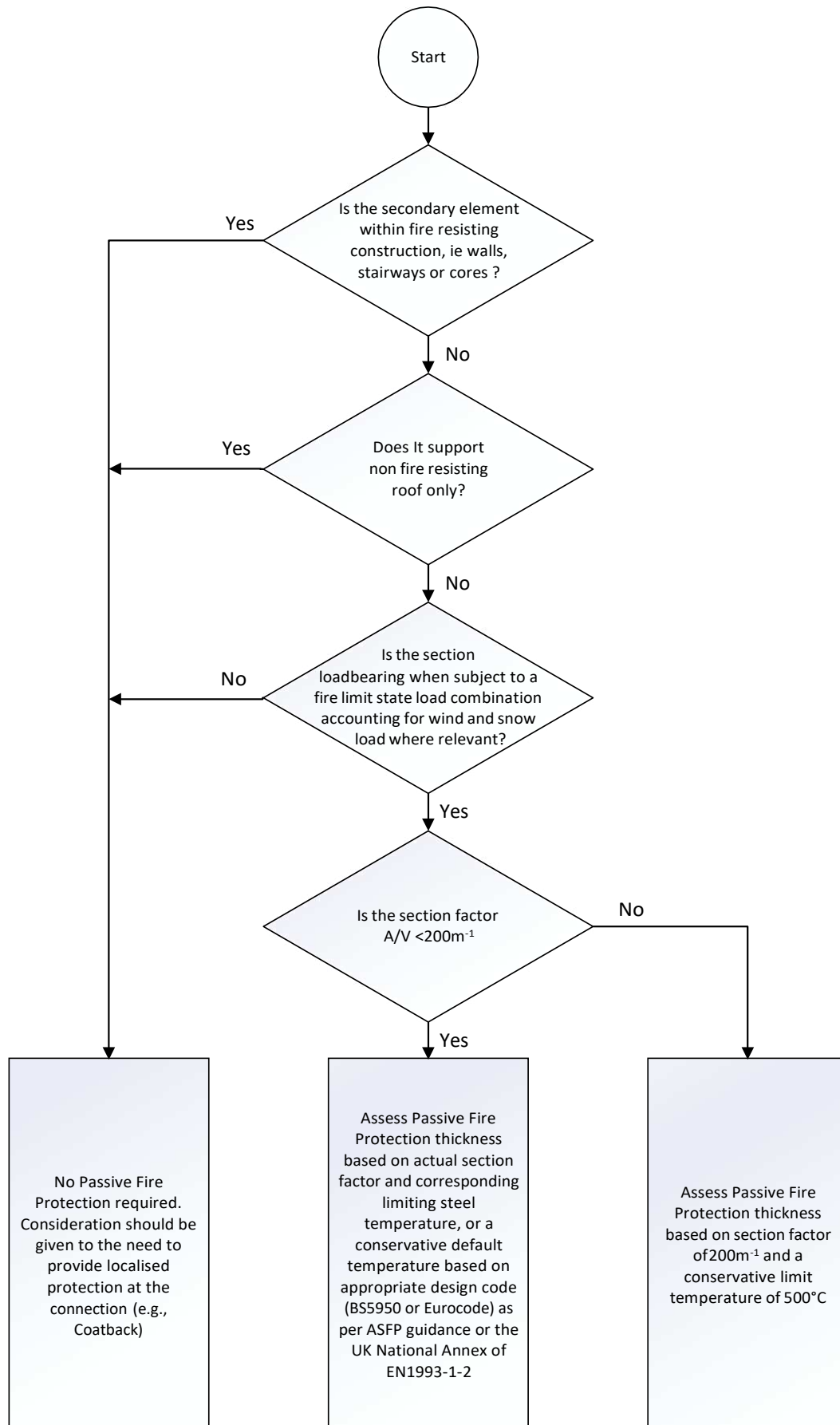


Figure 1 – Flow chart showing passive fire protection requirements for secondary steelwork

Where the actual section factor is less than 200m^{-1} , then the corresponding limiting steel temperature should be in accordance with the Column default temperature for Eurocode or British Standard designs as per ASFP guidance in Tables 16-18.

Where the actual section factor is greater than 200m^{-1} , use a section factor of 200m^{-1} and a limiting steel temperature of 500°C .

For all Secondary Element members, the protection thickness should also be based upon the appropriate Column data set (I section or Hollow section).

In some cases, it might not be necessary to apply fire protection to bracing members and consideration should be given to:

- Shielding bracing members from fire by placing them in vertical shafts or within walls;
- The use of infill masonry walls which, although they are typically ignored in terms of overall stability at ambient temperature, can provide the sufficient shear capacity during a fire instead of relying on the steel bracing systems;
- The possibility that only bracing systems within a fire compartment might be subjected to elevated temperatures and the other unaffected bracing systems might be sufficient to provide the required stability at the fire limit state;
- The possibility that the steel beam to column connections might have sufficient stiffness to ensure stability at the fire limit state.

In the event that the decision has been taken that Fire Protection may be required for the secondary steelwork, flowchart in Figure 1 is offered for assistance in determining how best to provide the protection for the secondary structural steel.

The flowchart in Figure 1 was compiled using information from AD-B, BS9999, BS5950-8, Warrington fire report 52047 provided to ASFP by Sherwin-Williams (formerly Leighs Paints), BS EN1993-1-2 and PFP Specialists report TR 1901.

The flowchart, and the advice in this guidance is applicable for structures designed in accordance with either BS5950-8 or the Eurocode BS EN1993-1-2 (including the UK national annex).

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