

# OPEN FIRE-PLACE DESIGN

This fact sheet outlines the basic design and construction principles for a typical Australian open fireplace covering four basic fireplace components; the base, firebox, smoke chamber and the chimney.

## COMPONENTS

- (A)** The **pad footing** is a spread foundation that supports the point loads of the fireplace and chimney.
  - (B)** The **hearth** is defined as the part of the fireplace where the fire burns and the immediate area in front of the opening.
  - (C)** The **fireplace opening** is a framed opening in a fireplace system that provides access to the firebox.
  - (D)** The **combustion chamber** is the chamber in which the fire is housed. The back and side walls of the combustion chamber shall be constructed as two separate leaves of masonry. An angled rear wall is recommended.
  - (E)** The **throat** is a narrow opening at the top of the firebox which allows flames, smoke and combustion gases to pass into the smoke chamber and upward through the chimney.
  - (F)** The **smoke shelf** is an optional component of fireplace design. It assists in diverting downdrafts from the outside back up the chimney flue. The shelf should be cleaned of debris each season.
- All clay bricks are acceptable  
• 1C:2L:6S or M2 mortar is recommended

## DESIGN REQUIREMENTS

### A – Pad footing

The pad footing shall:

- be reinforced with SL72 mesh at the top and bottom;
- extend 300 mm past the edge of the masonry except for an edge flush with the outer wall; and
- be 150 mm thick for 1 storey and 200 mm thick for 2 storey houses.

### B – Hearth

The hearth shall:

- be constructed of non-combustible material<sup>1</sup>;
- extend at least 300 mm beyond the fireplace opening and at least 150 mm on either side; and
- be level or be sloping toward the back of the firebox.

### C – Fireplace Opening

The fireplace opening shall:

- have an opening up to 1.5 m wide. It is recommended the opening height be less than eight courses high (685 mm); and
- be adequately supported at the top, typically using a brick arch or a reinforced masonry lintel system.

### D – Combustion Chamber

The combustion chamber shall:

- be at least 180 mm thick, excluding any cavity of the structural wall.

### E – Throat

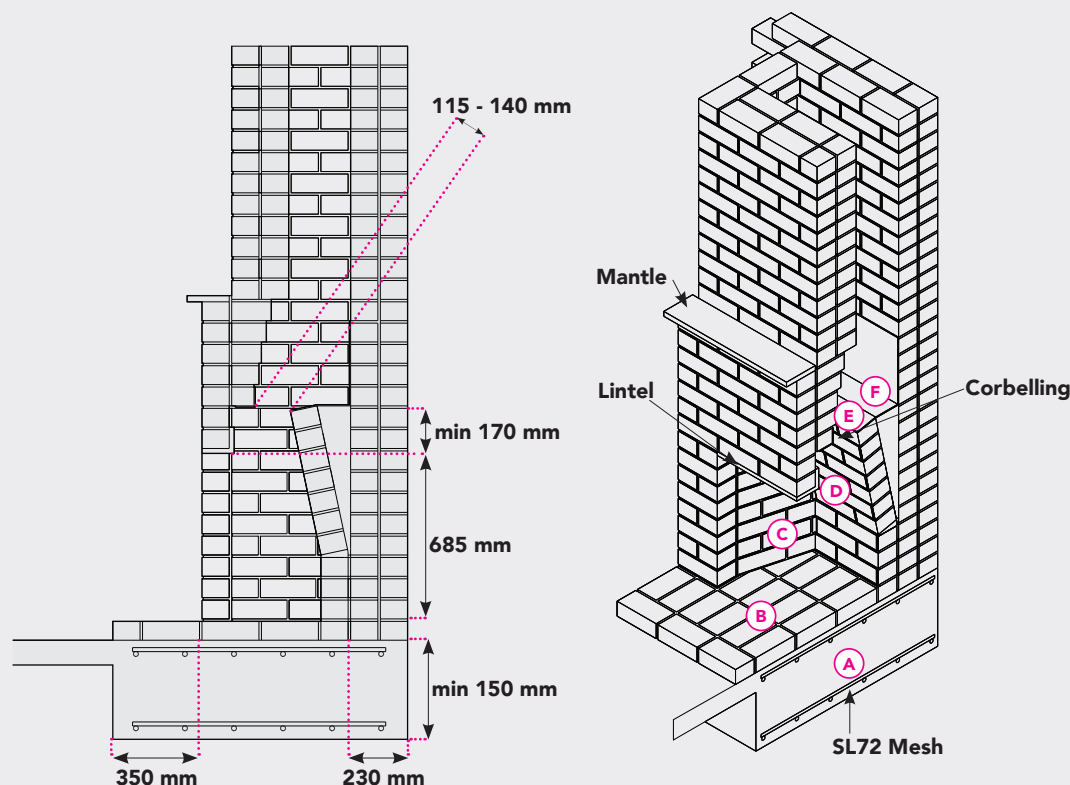
The throat shall:

- be a minimum of 170 mm above the highest point of the fireplace opening; and
- have an opening equal to approximately 10% of the fireplace opening area and have a width between 115 mm to 140 mm.

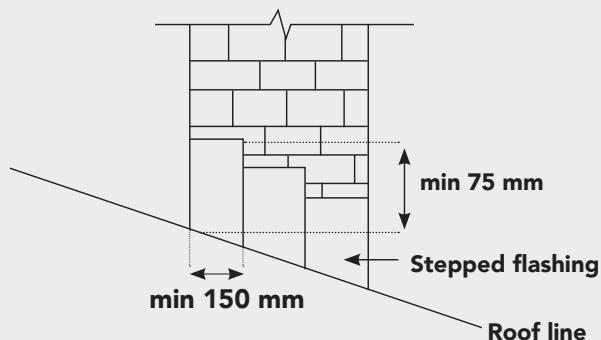
### F – Smoke Shelf

The smoke shelf shall:

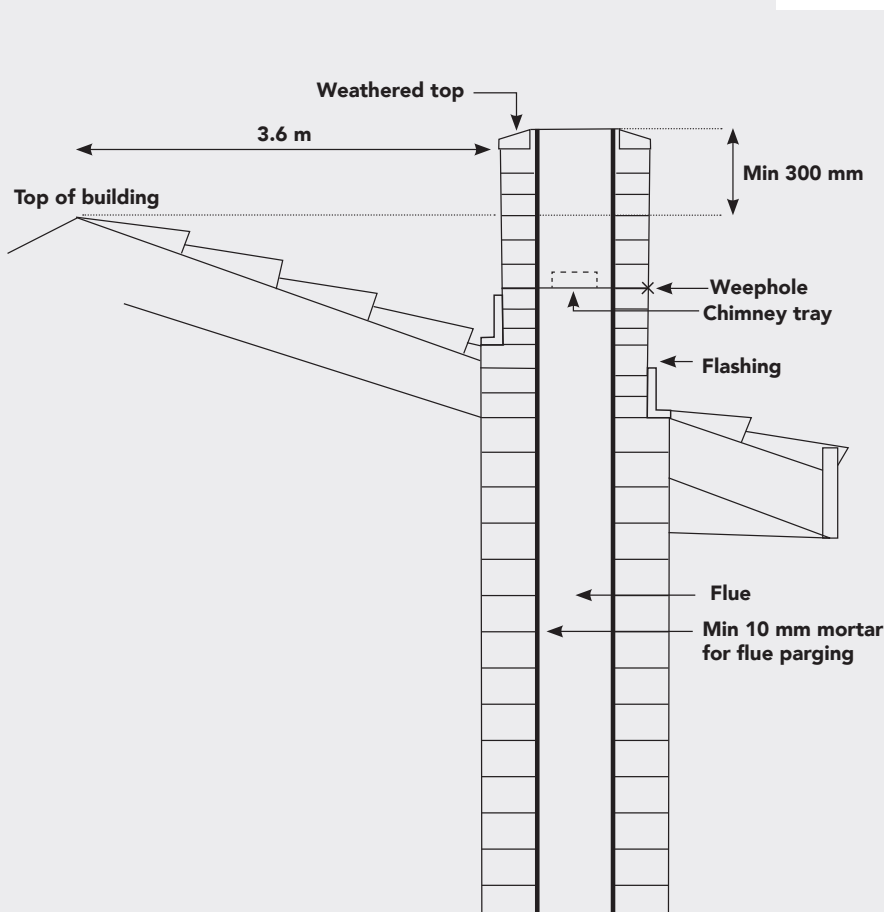
- be placed directly under the flue; and
- extend the full width of the throat.



\*STANDARD BRICK UNITS USED



**Figure 1 - Stepped flashing detailing**



**Figure 2 - Cross-section chimney and flue**

## CHIMNEY

**Flashing** - At the penetration of the chimney with the roof, 1.8 mm thick 20kg/m<sup>3</sup> lead metal flashings shall be provided. The stepped flashing shall:

- extend a minimum of 75 mm from the roof line along the length of the chimney;
- extend a minimum of 150 mm in width surrounding the chimney; and
- be moulded into the roof tiles to prevent drainage.

**Chimney Top** - The chimney is to terminate at a minimum of 300 mm above the highest point of a building within 3.6 m of the chimney top. This prevents any eddies or downdrafts entering the chimney from the surrounding roof structure.

The top of the chimney should be finished with an oversailing course with a weathered topping of cement mortar to divert stormwater away from the opening.

**Chimney Tray** - The chimney tray acts as an internal drain in the flue to divert rainwater. It may be constructed from lead or copper and should have all joints soldered.

The tray should extend 20 mm inside the flue with 25 mm turnup around all sides. The tray is extended to all four walls of the chimney, forming a damp-proof course and water is drained via several weepholes.

**Flue** - The flue is the duct used to exhaust the smoke and gases from the fire to the chimney top.

For fireplaces up to 1.5 m wide, a flue measuring 700 x 155 mm is recommended. The flue should be parged with a minimum of 10 mm mortar<sup>2</sup>.

**Damper** - The damper (not shown in the diagram) is a flap that lies in the throat above the firebox or at the top of the chimney. The fireplace must be provided with a damper that can be closed to seal the chimney or flue.

### Notes:

1. Non-combustible materials shall comply with Australian Standard AS1530.1.
2. Refractory mortar is not required. 1C:2L:6S mortar is recommended

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