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## 3-7A: CONCRETE MASONRY FIREPLACES

Size of room, ft x ft (m x m)	Width of fireplace opening, in. (mm)	
	in short wall	in long wall
10 x 14 (3.05 x 4.27)	24 (610)	24 to 32 (610-813)
12 x 16 (3.66 x 4.88)	28 to 36 (711-914)	32 to 36 (813-914)
12 x 20 (3.66 x 6.10)	32 to 36 (813-914)	36 to 40 (914-1,016)
12 x 24 (3.66 x 7.32)	32 to 36 (813-914)	36 to 48 (914-1,219)
14 x 28 (4.27 x 8.53)	32 to 40 (813-1,016)	40 to 48 (1,016-1,219)
16 x 30 (4.88 x 9.14)	36 to 40 (914-1,016)	48 to 60 (1,219-1,524)
20 x 36 (6.10 x 10.97)	40 to 48 (1,016-1,219)	48 to 72 (1,219-1,829)

Flue shape	Net cross-sectional area of flue, fraction of fireplace opening size
Round	$\frac{1}{12}$
Square	$\frac{1}{10}$
Rectangular:	
aspect ratio < 2 to 1	$\frac{1}{10}$
aspect ratio $\geq$ 2 to 1	$\frac{1}{8}$

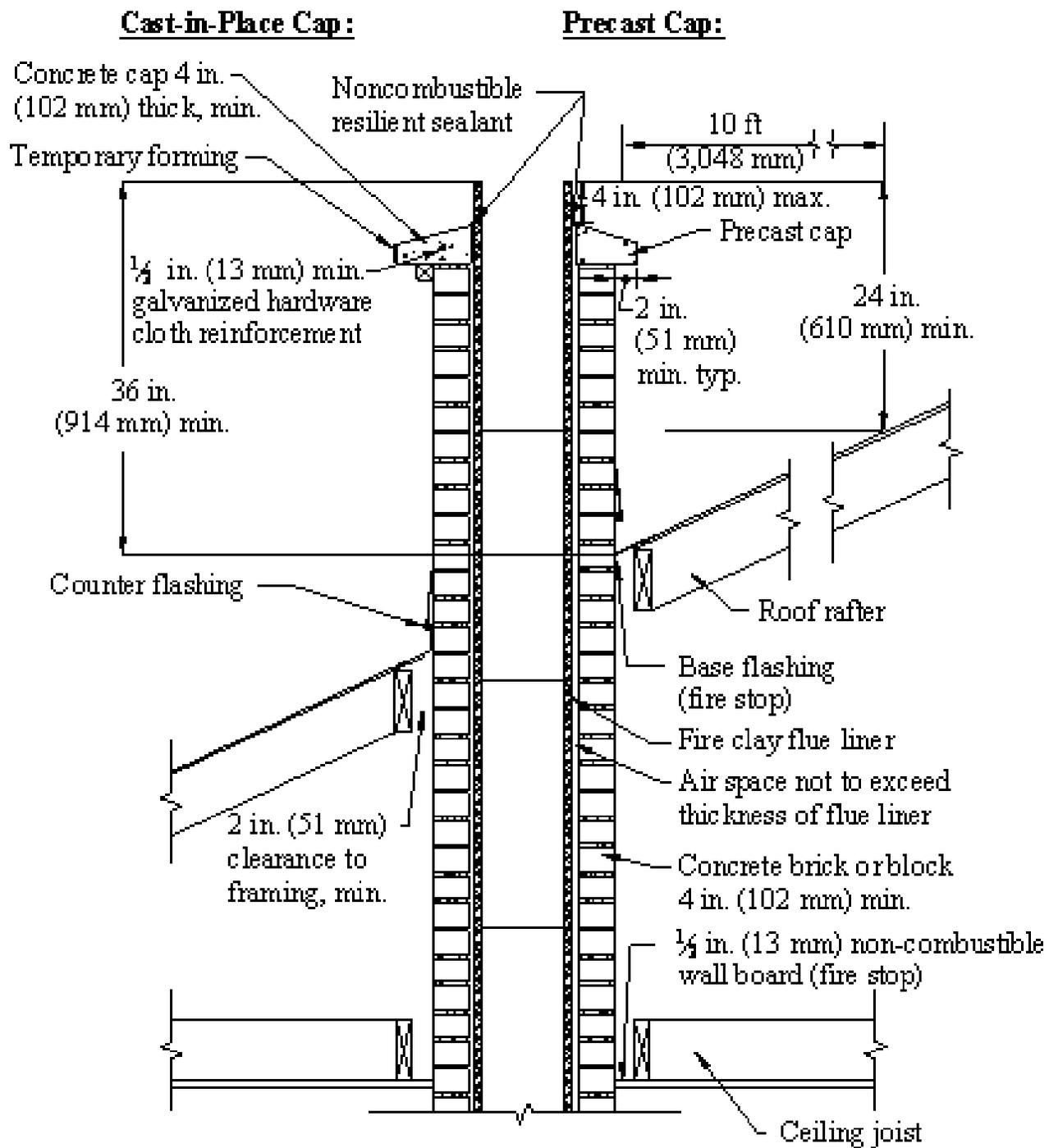
The chimney must extend at least 3 ft (914 mm) above the point where the chimney passes through the roof and at least 2 ft (610 mm) above any part of the building within 10 ft (3,048 mm) of the chimney (see Figure 2). Higher chimneys may be required for adequate draft. Good draft is normally achieved with 15 ft (4,572 mm) high chimneys (measured from the top of the fireplace opening to the top of the chimney).

The chimney must be capped to resist water penetration. A mortar wash that is feathered to the edge of the chimney wall is not an adequate cap. The cap should be either cast-in-place or precast concrete, as shown in Figure 2. Metal pan flashing over the top of the chimney will also perform adequately.

### ENERGY EFFICIENCY

Proper fireplace design and operation helps maximize the efficiency. Maintaining efficient fuel consumption by properly adjusting the damper is critical. There are several other ways to significantly improve the performance of the concrete masonry fireplace. For example, positioning the fireplace on interior rather than exterior walls reduces heat loss when the fireplace is not in operation, and increases the amount of usable radiant heat from the concrete masonry.

Fireplace efficiency can also be improved by introducing external air into the firebox for draft and combustion (not within the garage or basement. An external combustion air system requires a damper in the firebox, adequate ducting or air passageways and a grill or louver at the exterior opening. The external air damper should permit the control of both the direction and volume of the airflow for temperature control. The damper should be capable of directing air flow towards the back of the firebox so that when down drafts or negative pressures occur, hot ashes or embers are not forced into the room.



**Figure 2-- Chimney Roof Penetration**

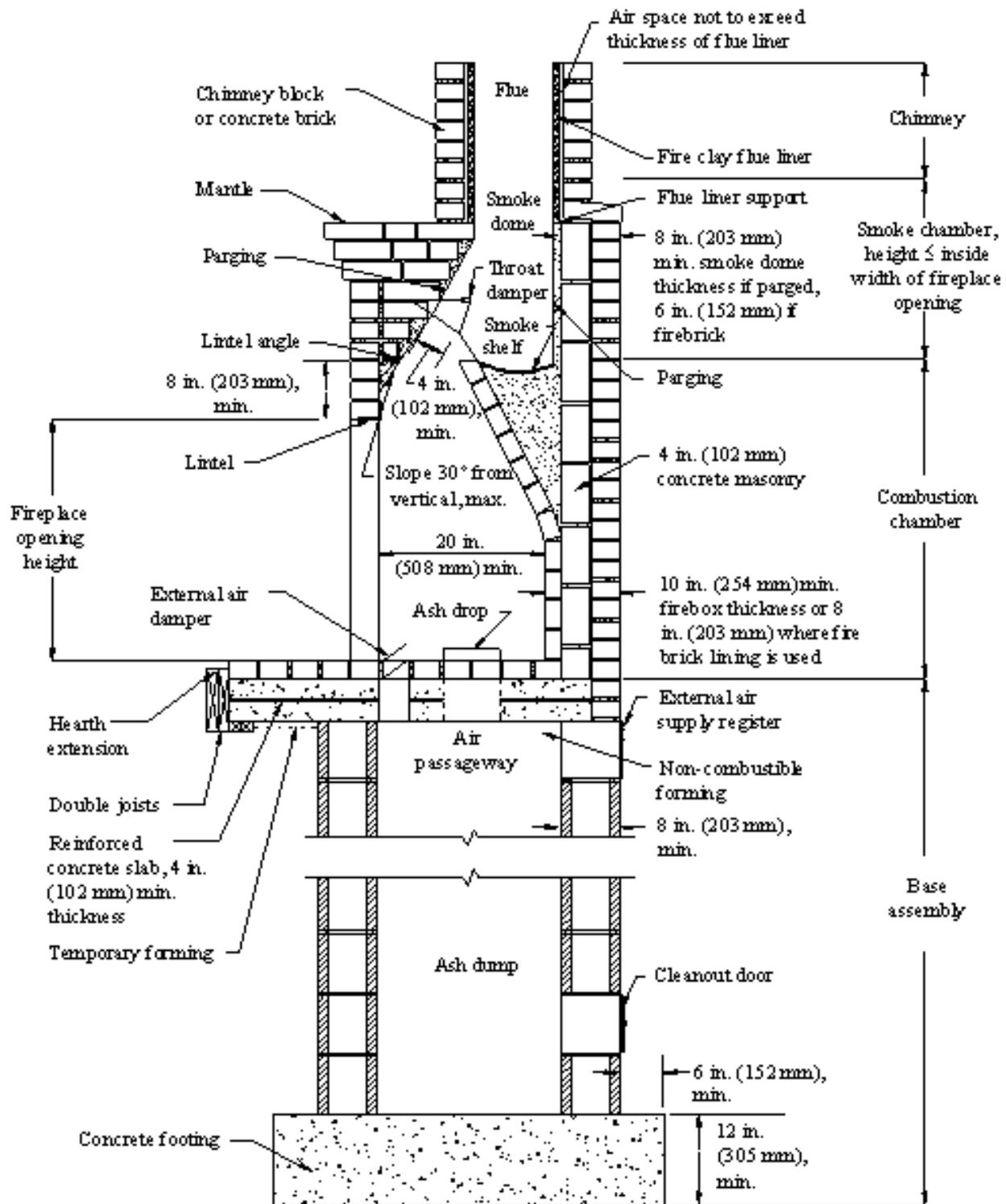


Figure 1--Single Opening Fireplace