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Building Constructi on



Fire place

CONTENTS

2

- ❑ Introduction
- ❑ Terminologies
- ❑ Types of fire-places
- ❑ Function and components of a chimney
- ❑ Materials for chimney construction

INTRODUCTION

3

- ❑ A **fireplace** is an architectural structure that contain a fire for heating.
- ❑ A fire is contained in a firebox or fire pit; a chimney or other flue directs gas and particulate exhaust to escape.
- ❑ A fire place is a framed opening in a chimney to hold an open fire. It must be designed and constructed to:
 - Sustain the combustion of fuel.
 - Draw properly to carry smoke and other combustive by-products to the outside.
 - Radiate the maximum amount of heat comfortably in to the room.

➤ Ensure proper distances from combustible

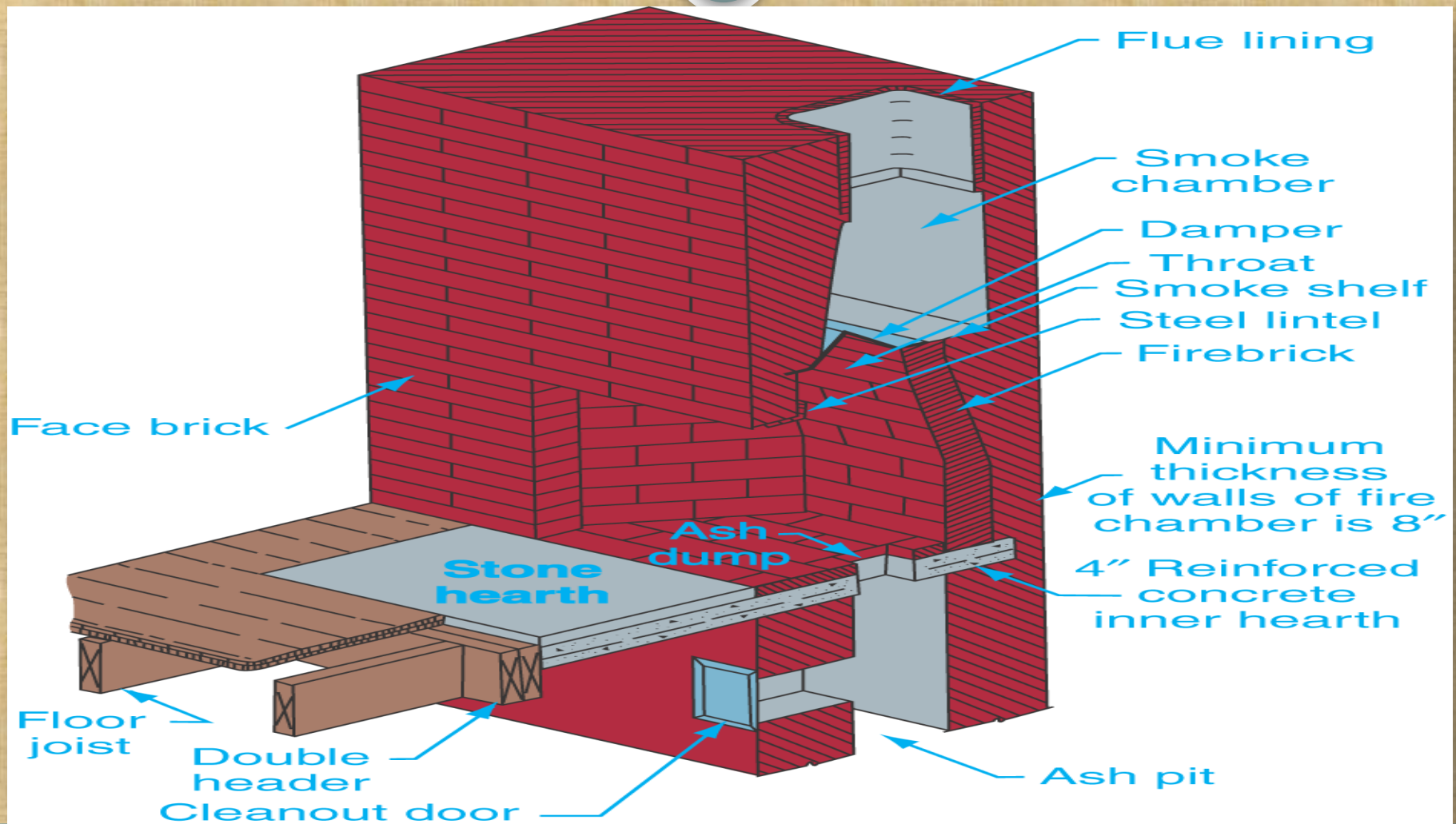
TERMINOLOGIES

4

- **Ash dump**: Where ashes are stored.
- **Cleanout**: Provides access to ash dump.
- **Damper**: Controls air flow.
- **Fireclay**: Bonding agent between firebrick.
- **Flue**: Chimney inside layer.
- **Hearth**: Reduces the chance of fire in the room from sparks.
- **Inner hearth**: Fireplace floor.
- **Smoke chamber**: Area above the damper.
- **Smoke shelf**: Deflects air upward.

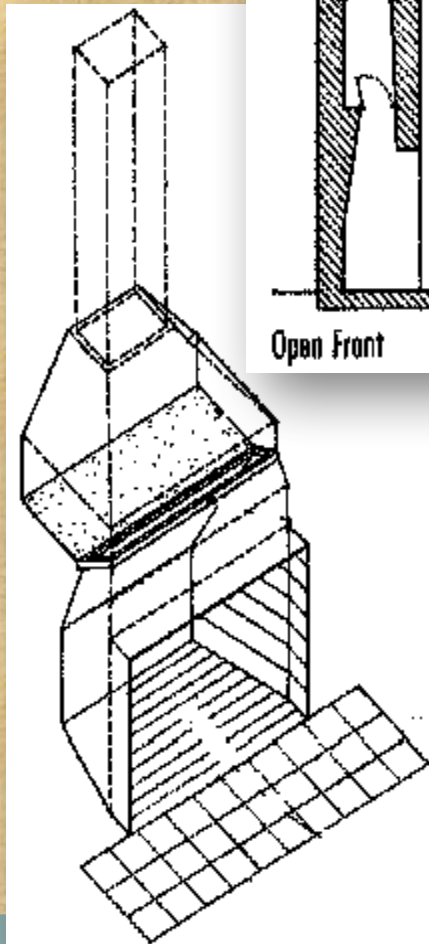
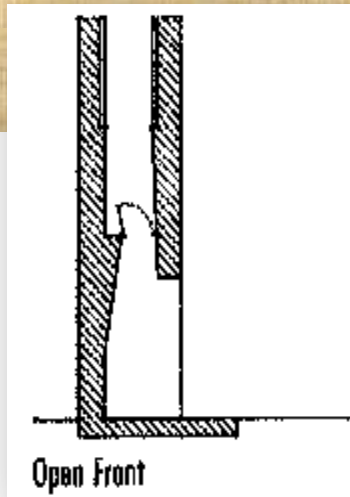
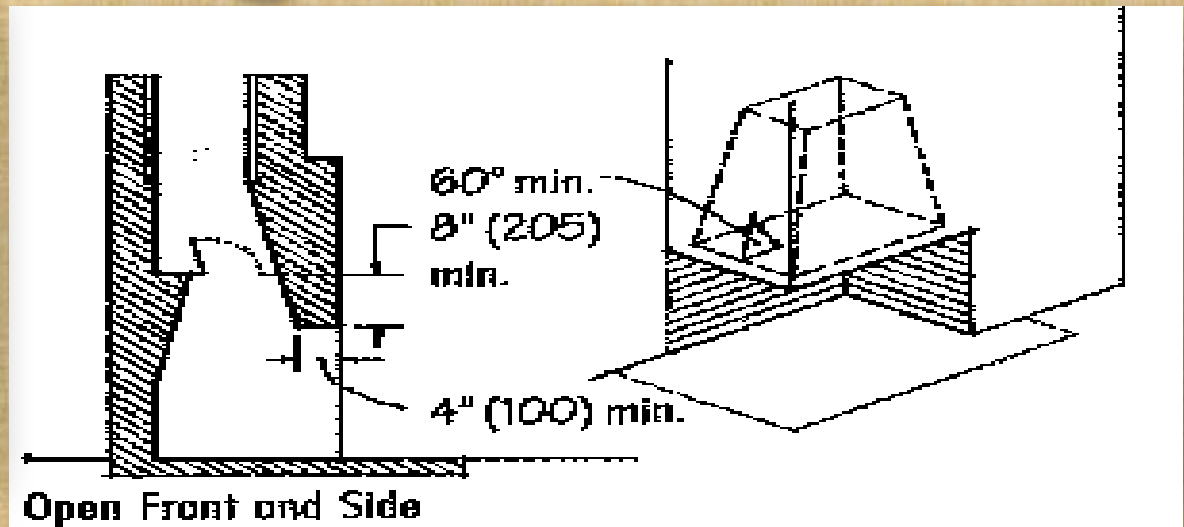
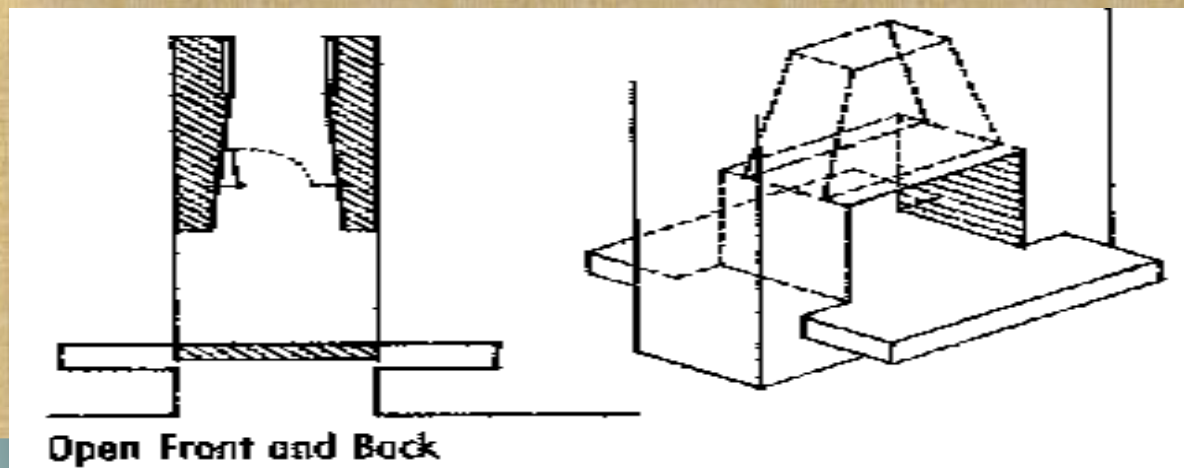
TERMINOLOGIES

5



TYPES OF FIRE PLACES

6



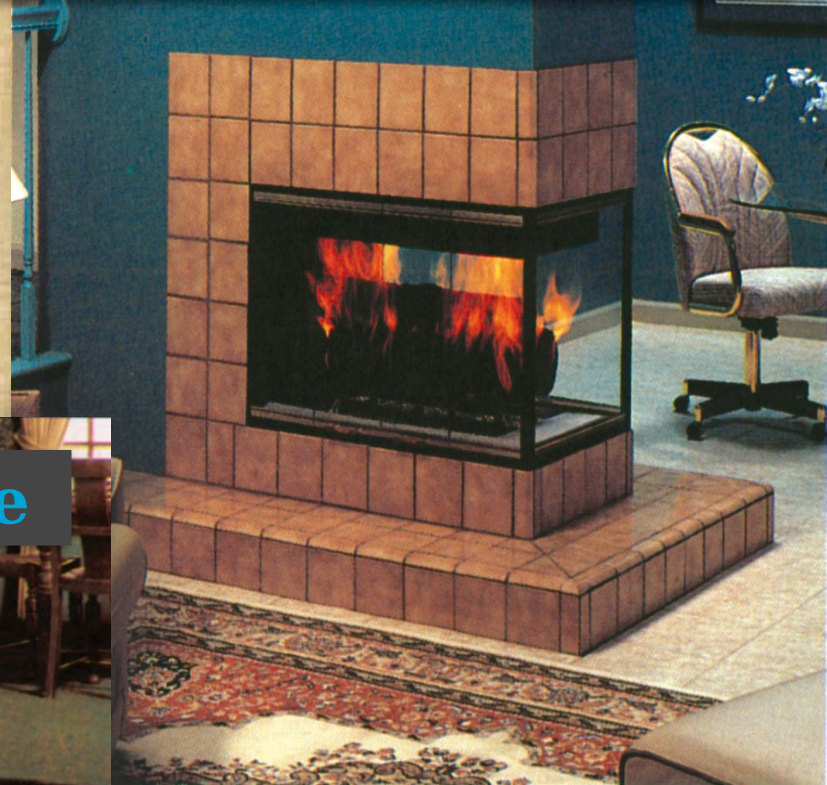
TYPES OF FIRE PLACES

7

Single-face fireplace



Three-face fireplace



Two-face adjacent fireplace



FUNCTION AND COMPONENTS OF A CHIMNEY

8

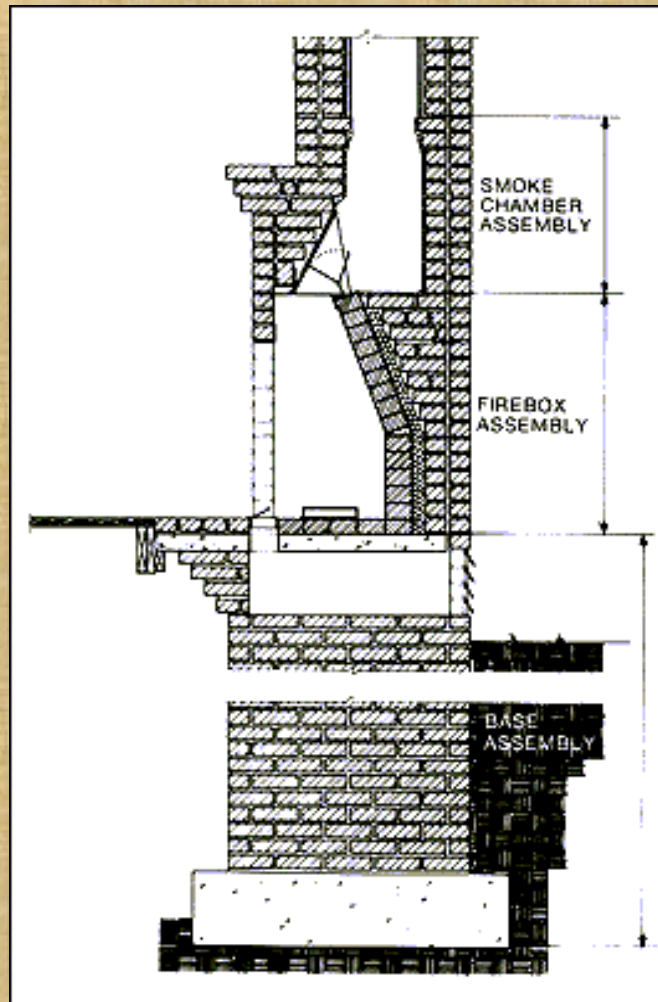
- ❑ When **chimneys**, **fireplaces** and **flues** are constructed as an integral part of the structure, they must fulfill the requirements of **weather exclusion**, **thermal insulation**, **sound insulation** and **fire protection**, at least to the same degree as the wall or the partition of which they form a part.
- ❑ The major components of a chimney include the **foundation**, **chimney breast**, **flues** and **chimney stacks**.

A. Foundations:

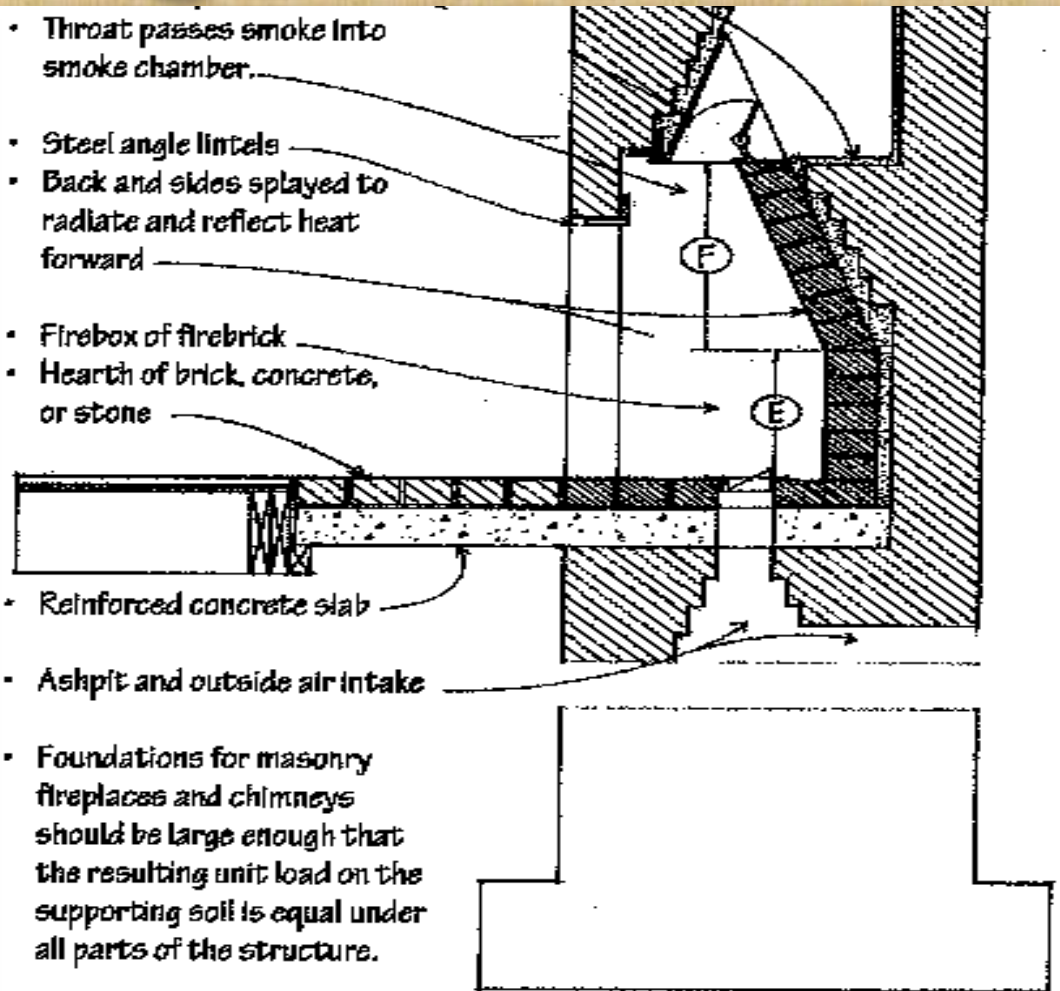
- The foundation of a chimney shall be properly designed and should be at least as deep as the adjacent walls.
- The chimney is often wider than the wall and

FUNCTION AND COMPONENTS OF A CHIMNEY

9



- Throat passes smoke into smoke chamber.
- Steel angle lintels
- Back and sides splayed to radiate and reflect heat forward
- Firebox of firebrick
- Hearth of brick, concrete, or stone
- Reinforced concrete slab
- Ashpit and outside air intake
- Foundations for masonry fireplaces and chimneys should be large enough that the resulting unit load on the supporting soil is equal under all parts of the structure.



FUNCTION AND COMPONENTS OF A CHIMNEY

10

B. Chimney breast:

- A fire place generally needs greater depth than the thickness of a wall. Hence the chimney is accommodated in the chimney breast.
- This projection can be avoided if chimney is provided in external walls where the projection can be provided on the outer side.

C. Flues:

- The purpose of the flue from a fireplace is to provide an outlet for the products of combustion and also to include the airflow through the fire necessary for the burning of the fuel.
- All open fire depend on the suction developed

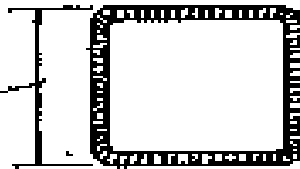
FUNCTION AND COMPONENTS OF A CHIMNEY

11

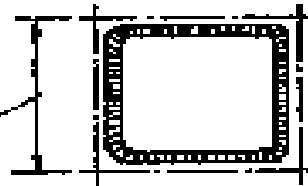
A- cool air enters

B- the cool air is heated and released

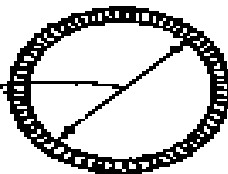
- Rectangular flues
- Size = outside faces



- Modular flues
- Size = actual + $\frac{1}{2}$ " (13)

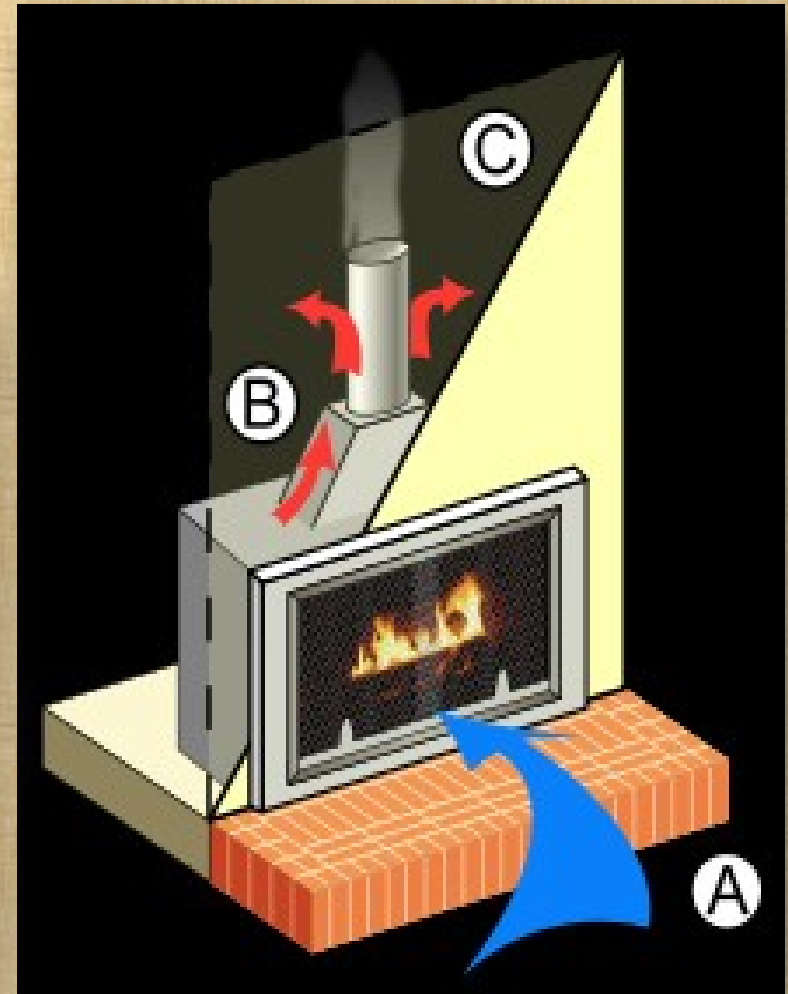


- Round flues
- Size = inside $\varnothing$



Minimum Flue Sizes

- Square or rectangular: $\frac{1}{10}$ th of fireplace opening
- Round: $\frac{1}{12}$ th of fireplace opening

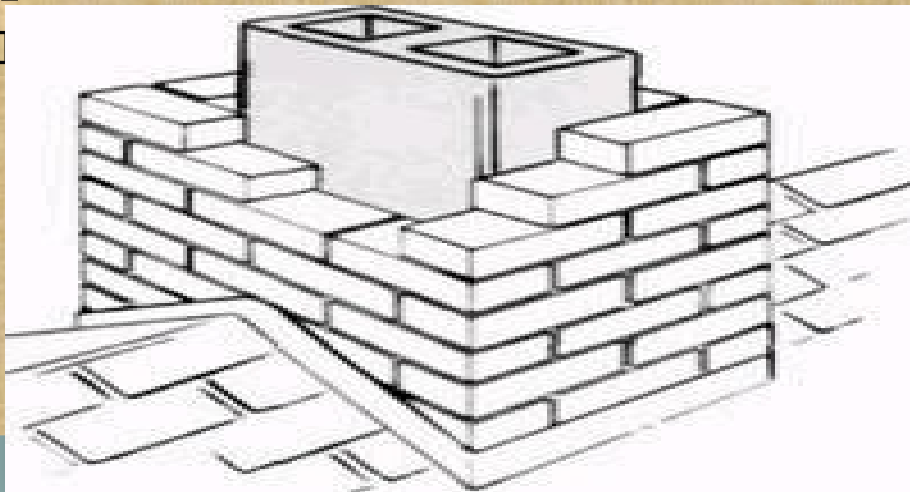


FUNCTION AND COMPONENTS OF A CHIMNEY

12

D. Chimney stacks:

- The chimney breasts are reduced in width when they penetrate above the roofs.
- To prevent down draught, the chimney stack is generally taken at least one meter above the ridge.
- Special considerations should be given to preventing rain running down the walls.



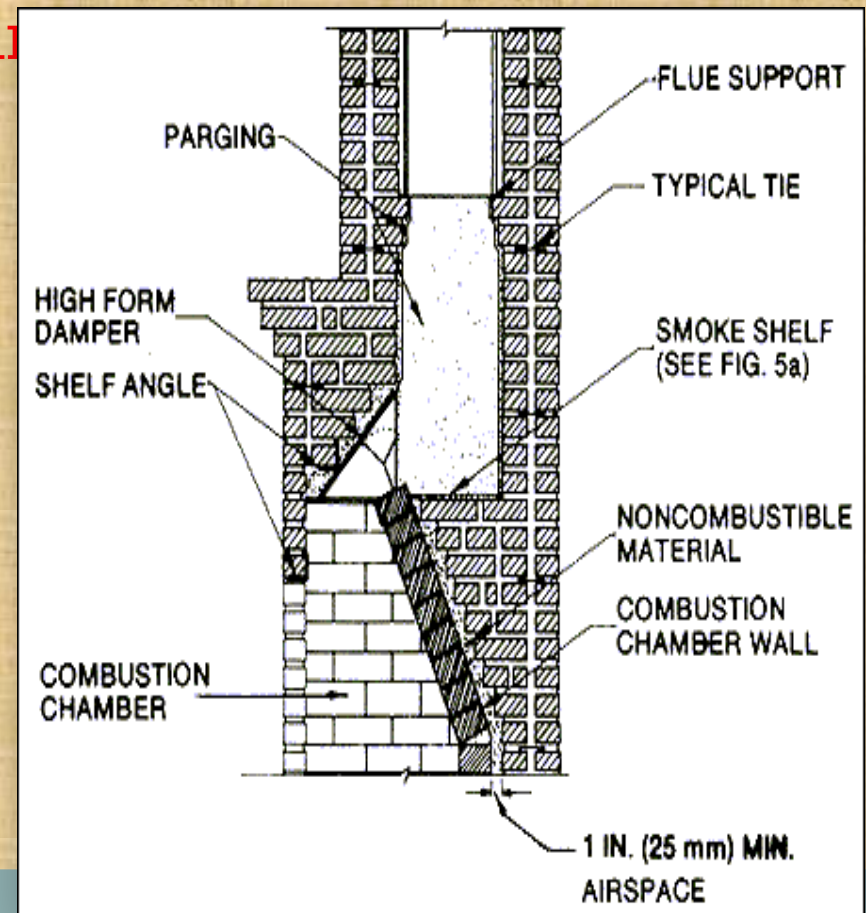
MATERIALS FOR CHIMNEY CONSTRUCTION

13

❑ The major building materials used for the construction of chimneys and fire places include

bricks, concrete, masonry, and metals.
Brick chimneys:

- Brick is the traditional material used for building chimneys.
- The application of damp proof courses are necessary at the base of the chimneys to prevent rising dampness.
- Since brick chimneys are very heavy, care has to be taken during the design of foundations.



MATERIALS FOR CHIMNEY CONSTRUCTION

14

B. Concrete chimneys:

- Concrete chimneys are becoming more popular nowadays due to their **better appearance** and **economical consideration** both initially and during maintenance.
- Concrete chimneys can be formed either by using precast units or cast in situ, or a combination of both methods.

C. Stone masonry chimneys:

- The conditions of exposure for chimney stacks above the roof, together with the risk of condensation of the products of combustion, limit the choice of stone.
- So the stone has either to be sand stone or has to be protected by fire brick.

MATERIALS FOR CHIMNEY CONSTRUCTION

15



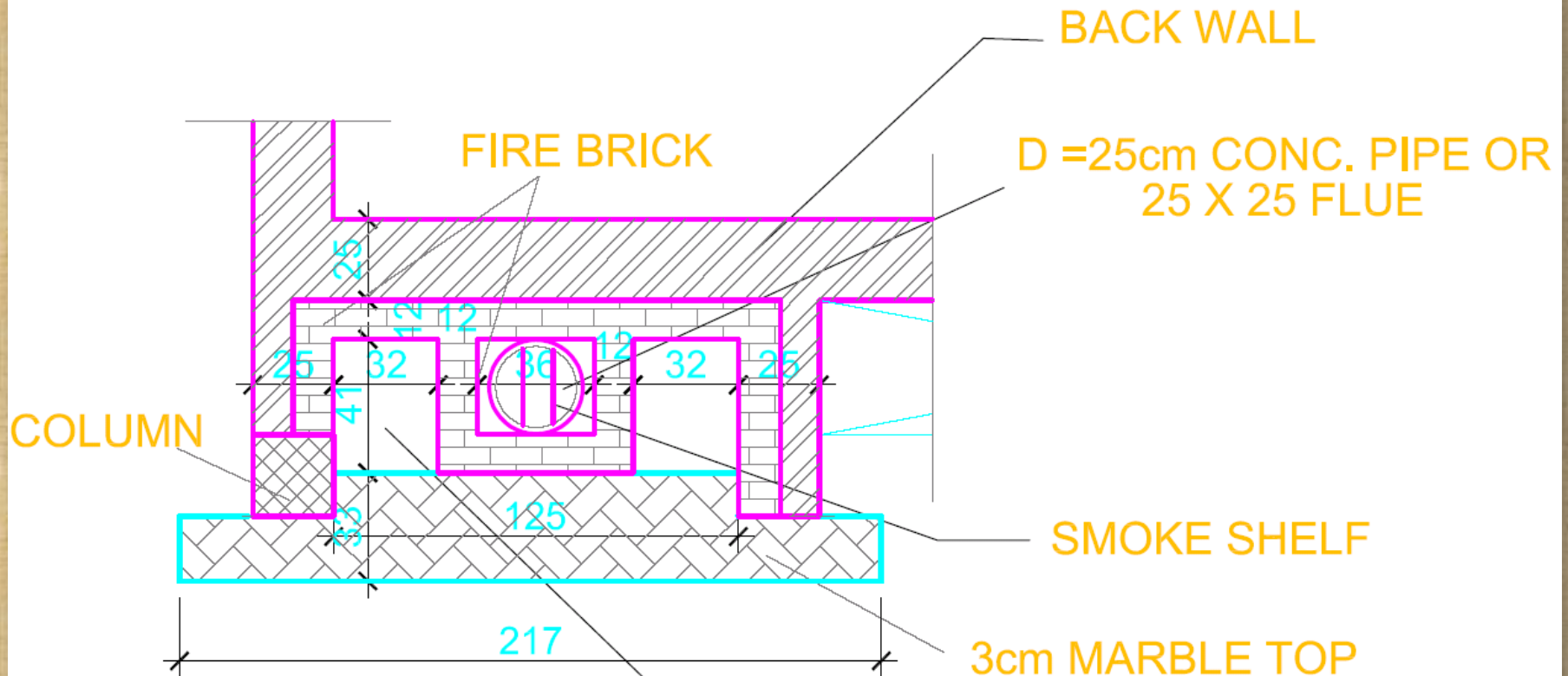
D. **Metal flues:**

- The use of free-standing metal flues in buildings is restricted. However, steel or cast-iron can be used to produce metal flues.
- Though metal chimneys are light in weight, they require careful maintenance and large initial expenses.

DETAIL OF CHIMNEY

16

PLAN at R - R

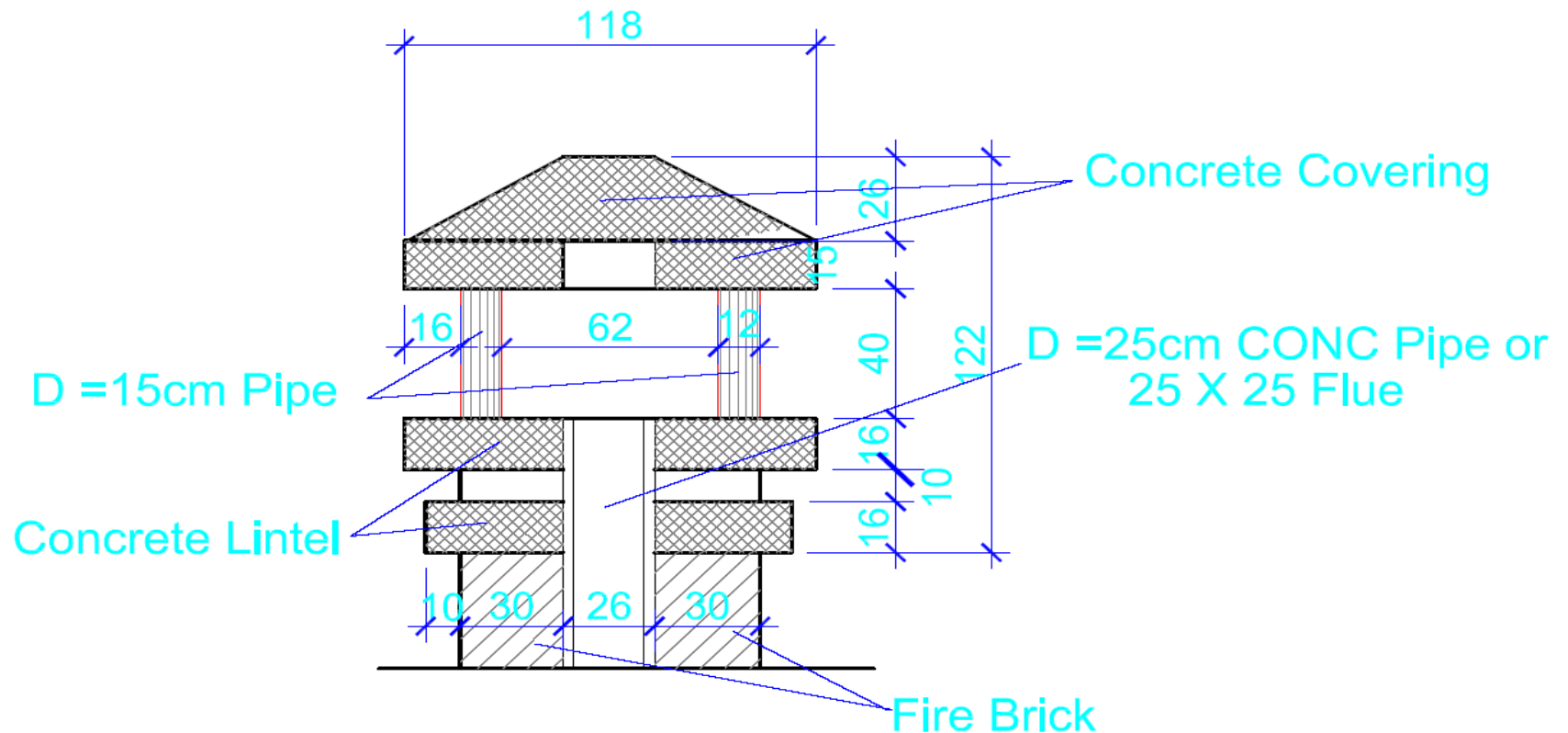


17



DETAIL OF CHIMNEY

18



CHIMNEY HEAD DETAIL - 1

DETAIL OF CHIMNEY

19

