1

Building Construction

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 materials.

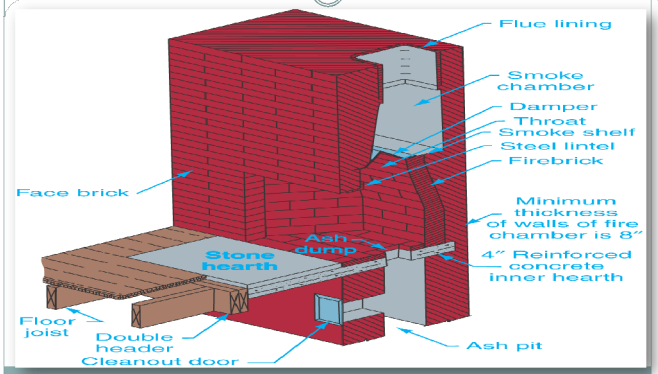
TERMINOLOGIES

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.

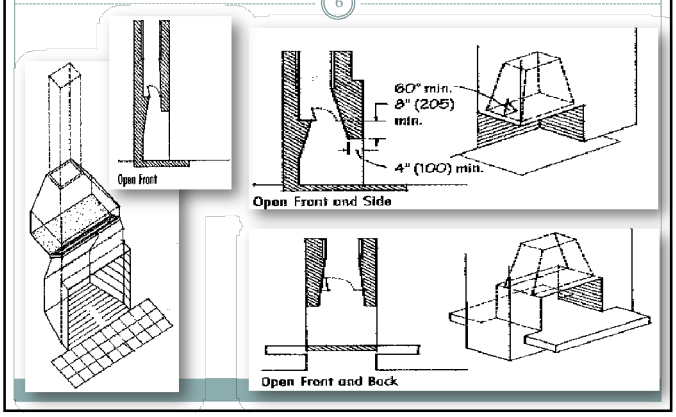
TERMINOLOGIES

5



TYPES OF FIRE PLACES

6



TYPES OF FIRE PLACES

7

FUNCTION AND COMPONENTS OF A CHIMNEY

8

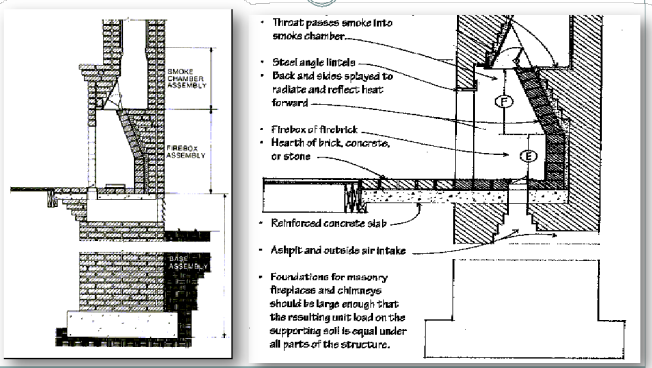
- When **chimneys**, **fireplaces** and **flues** are constructed as an integral part of the structure, they must fulfill the requirements of **weather exclusion**, **thermal insulation**, **sound insulation** and **fire protection**, at least to the same degree as the wall or the partition of which 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 thus it will be necessary to make the foundations larger.

FUNCTION AND COMPONENTS OF A CHIMNEY

9



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 by the flue to provide sufficient air for combustion.

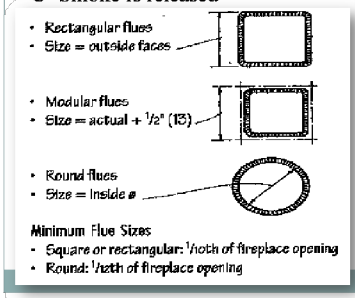
FUNCTION AND COMPONENTS OF A CHIMNEY

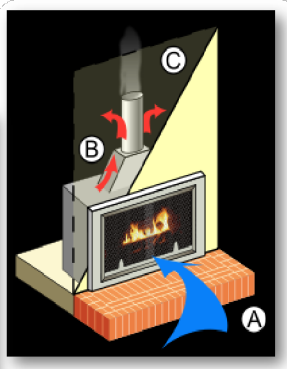
11

A- cool air enters

B- the cool air is heated and released

C- Smoke is released



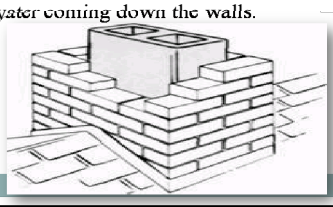


FUNCTION AND COMPONENTS OF A CHIMNEY

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 prevent the rain water coming down the walls.



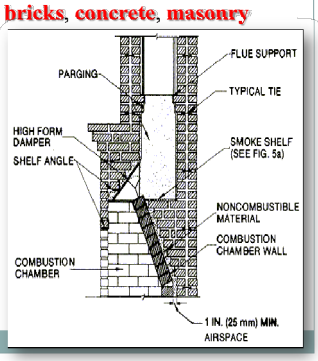
MATERIALS FOR CHIMNEY CONSTRUCTION

13

❑The major building materials used for the construction of chimneys and fire places include **bricks**, **concrete**, **masonry stones**, and some **metals**.

A. 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:

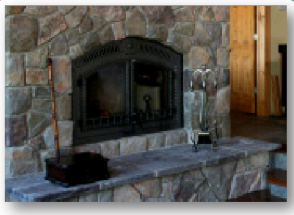
- Concrete chimneys are becoming more popular nowadays due to their **better appearance** and **economical consideration** both initially and during maintenance.
- Concrete chimneys can be formed either by using precast units or cast in situ, or a combination of both methods.

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

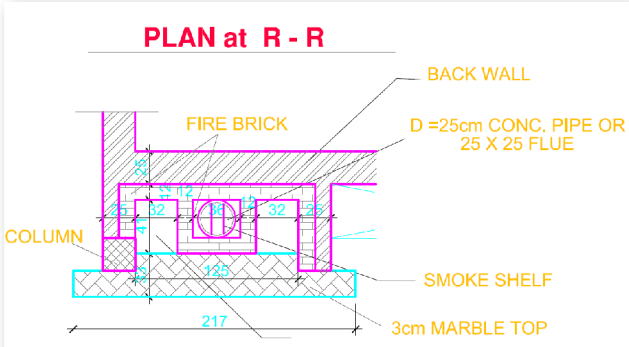


D. Metal flues:

- 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.

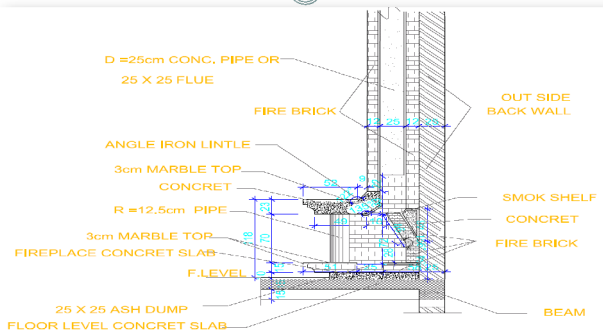
DETAIL OF CHIMNEY

16



DETAIL OF CHIMNEY

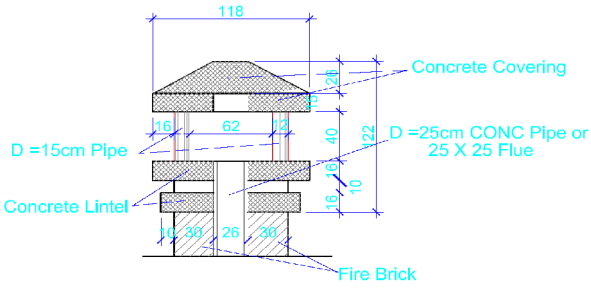
17



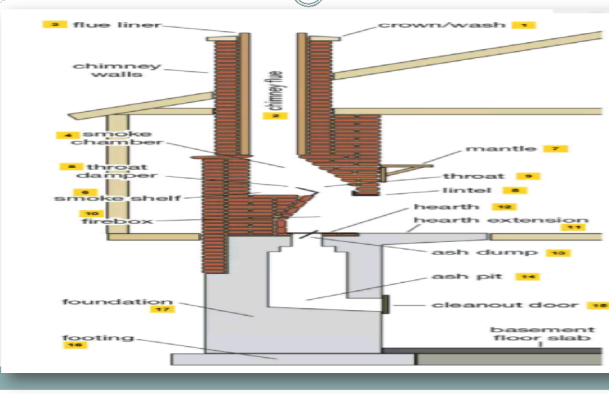
SECTION S - S & R - R

DETAIL OF CHIMNEY

18



CHIMNEY HEAD DETAIL - 1

DETAIL OF CHIMNEY

19