4. **Glazed or sash doors:** This type of door is used in residential as well as public buildings like hospitals, schools or colleges etc. with a view to supplement the natural lighting provided by windows or to make the interior of one room visible from the adjacent one. Glazed or sash doors are made several designs. They can be glazed fully or partly. Fully glazed doors are recommended in situations where sufficient light is required through the door opening as in case of shopping or centres, lobbies, entrance hall etc. in case of partly glazed doors normally the bottom 1/3rd height of the door is panelled and the remaining 2/3rd height is glazed. In case of partly glazed doors, the stiles are sometimes diminished at the lock rail to improve the elevation and to permit more area of glazing in the process (Fig. 17.14,17.15&17.18).

5. **Flush doors:** With the large scale production of plywood and face veneers, use of flush door has become very popular these days. Flush doors have pleasing appearance, simple construction, his high strength and durability and cost less as compared with panelled doors. These doors are commonly used in residential as well as public buildings. Flush door shutter consists of a solid or semi-solid framed skeleton (core) covered on both faces with either plywood or a combination of cross bands and face veneers giving perfectly flush and jointless surface. In case commercial type plywood or face veneer is used for the face panel the door is termed as commercial type flush door. Similarly if decorative type of plywood or face veneer is used for face panel, the door is named as decorative type of flush door.

25 mm thick shutter is considered suitable for door openings upto 80 cm x 210 cm in size, 30 mm or 35 mm thick shutter is used for door opening of 90 cm x 210 cm in size whereas 40 mm thick flush door shutter is recommended for door openings ranging from 100 cm x 210 cm to 120 cm x 210 cm in size.
Types of flush doors:

(i) Solid core type flush doors (Fig. 17.19).
(ii) Cellular core type flush doors (Fig. 17.20).
(iii) Hollow core type flush doors (Fig. 17.21).

6. Fly proof doors: This type of door is used to check the entry of flies, mosquitoes, insects etc. into the room and to allow free circulation of air at the same time. The door consists of timber framework of vertical stiles and horizontal rails and the opening of the panels are fitted with fine-mesh galvanised wire gauge (Fig. 17.22). The G.I. wire is fixed by use of nails and timber beading. Generally the door opening inside the room is fully panelled whereas the fly proof or wire gauge shutter opens out side the room or vice versa.

   Fly proof doors are commonly provided for kitchens, canteens, refreshment rooms, cupboards for storing food, sweets, meat etc.

7. Revolving Door: Revolving door provides entrance on one side and exit on the other simultaneously keeping the opening automatically closed when not in use, the door is so advantageously provided in places where there is a regular foot traffic of people entering in and going out of the building especially when it is air conditioned or situated in a place where strong winds blow for most part of the year. The door essentially consists of four leaves radially attached to a centrally placed mullion in a circular opening. The mullion or the central member is provided with bill-bearing at the bottom and bush bearing at the top so as to enable the door to revolve smoothly without producing jerks. The leaves and the mullion are enclosed in a vestibule. At their edges the leaves are provided with rubber pieces which fit flexibly against the inside face of the vestibule. The attached leaves may be glazed, panelled or partly glazed and partly panelled (Fig. 17.24). Such doors are commonly provided in hotels, banks, offices and other such important public buildings.

8. M.S. Sheet Door: This type of door is recommended for railway goods sheds, garage, godowns etc. where high degree of protection and safety is needed. The door is normally provided with two shutters. The door shutter is fabricated from angle iron or channel section frame which is suitably braced with the angle iron diagonal braces or with m.s. flats
placed horizontally. Different members of the shutter frame are riveted or welded at the junctions. In case of riveted connection, gusset plates are necessarily used at each junction. Mild steel plates of required thickness are fixed to the shutter frame with rivets or welds. The outer frame of the shutters is provided with flat iron angle cleats for fixing the shutter to the door opening. Each cleat has a 25 mm dia. hole in the horizontal leg for supporting the shutter on pin clamps. Two pin clamps are used for each shutter. One end of the pin clamp is embedded in masonry and the other end has a 20 mm dia. m.s. pin riveted or welded to the clamp. The pin clamps are so placed that top pin faces downward and bottom pin faces upwards so that the shutter cannot be removed by lifting over the pins. The pins are made to pass through the holes in the cleats of outer frame of door shutters and that is how the shutters get supported and hence attached to the jambs.

9. **Sliding Door:** This type of door is considered suitable for shops, sheds, godowns, garage etc. and in places where the use of hinges for fixing the shutter is to be avoided. Depending upon the size of the opening, and the space available on either side, the door can have single, double or more number of leaves or shutters. The door is provided with top and bottom guide rails or runners within which the shutters slide. The guide rails run past the opening for a distance equal to the width of the shutter so that when the door is required to be opened. The door shutter occupies a new position parallel to the wall face and clear off the opening. The shutters are also provided with locking arrangements, handles, stopper etc. (Fig. 17.24)

10. **Swing door:** This type of door is generally provided in passages of public buildings like offices, banks etc. the door may have single shutter or two shutters. The shutters are fixed with special hinges known as double action spring hinges which hold the shutter in closed position when not in use. Since these doors are pushed open, they should have glazed shutters so as to enable the users to see the objects on other side of the door and avoid accidents. As the springs return the door with force, the glazing should preferably be carried out by use of wired glass or it should be protected by other suitable means. Such doors should not be rebated at the meeting sties. The closing edges of the meeting sties
should be segmental. Alternatively the door shutter should have a peep hole, fixed with glass. The peep hole should be at eye level. Details of a swing door with flush door shutter are shown in Fig. 17.28-17.29

11. Collapsible Steel Door: These doors are extensively used for shops, garages, public buildings, godowns etc. and in situations where width of opening is large and provision of hinged shutter becomes different for space. These doors are also used from consideration of increased safety and protection of the property. Collapsible steel doors are commonly recommended in situations where light and ventilation are desired even when the opening is closed. Depending upon the size of the opening, the door may have single or double shutters. The door essentially consists of vertical double channels each 29 x 20 x 2 mm in size spaced at 10 to 12 cm apart. The channels are joined together with the hollows of channels on the inside and are braced with flat iron diagonal 20mm wide and 5 mm thick which allow the shutter to open out or get folded. The shutters operate between two T-iron rails, one fixed to the floor and the other to the lintel by means of anchor bolts. The door shutter slides over roller mounted at its bottom or is held in position by the rails (Fig. 17.30). The door is provided with locking arrangements, handles, stoppers etc. and it can be opened or closed manually by slight push or pull.

12. Rolling Steel Shutter Doors: These doors are commonly used for show windows, stores, shop fronts and godown etc. The door shutter acts like a steel curtain and provides adequate protection and safety against burglars and fire. The shutter consists of thin steel slabs (also known as laths or slates) about 1.25 mm thick interlocked to each other and coiled upon specially designed pipe shaft ( also known as drum) mounted at the top of the opening. The door shutter travels in two vertical steel guide channels installed at either end of the opening. The door shutter travels in two vertical steel guide channels installed at either end of the opening.

The guide channels are made out of mild steel sheets and are deep enough to accommodate and keep the shutter in position. The shutter is counter balanced by means of helical spring enclosed in the drum and a hood of steel protects the drum, spring etc. from the weather (fig. 17.31).

When the area of door opening does not exceed 10 sq. m., the door shutter can be easily opened or closed by pushing it up or down
manually. The door in such a case is known as push pull type rolling shutter door.

When the area of door opening is more than 10 sq. m. the shutter is generally opened or closed by means of reduction gear operated by connecting rod and winding handle or by means of chain pulley blocks. The door in such a case is known as mechanical type rolling shutter door.

13. **Rolling Grill Doors:** The design, construction and operation of rolling grill door is similar to the rolling steel door in all respects except the type of shutter. In this case the grill shutter is built of aluminium alloy or steel links of 0.9 mm thickness assembled on tubes or rods. The grills can also be made out of 8 mm diameter mild steel or aluminium alloy round bars. The rolling grill shutter can be manufactured in a variety of designs to suit the individual’s choice. This type of door is used in situations where besides protection and safety, visibility and ventilation is also desired.

14. **Fire check doors:** Fire check doors are required to control and restrict the spread of fire through the door openings thereby minimising the damage of the adjoining property in the event of fire. By provision of fire check doors it is possible to prevent the spread of fire to communicating rooms and floors and to reduce the chimney effect thereby ensuring desired degree of fire protection to the building. The design of the fire check doors and the materials to be used in their construction should be such that doors are capable of resisting the intense heat of fire without distortion and its thermal conductivity should be sufficiently low to prevent the ignition of the combustible materials on either side. The fire resistance of the doors should as far as practicable be the same as that for the wall in which it is to be fitted. Normally for openings upto 1.5 meter wide, single leaf door shutter is used and for wider openings two leaves shutters is used. The doors can be of sliding, hinged, manually operated or automatic type.

The fire check doors can be of the following two types:

(i) Steel plate doors.

(ii) Metal covered doors.