

Types of Bonds in Brick Masonry Wall

The most commonly used types of bonds in brick masonry are:

1. Stretcher bond
2. Header bond
3. English bond and
4. Flemish bond
5. Facing bond
6. Dutch bond
7. English cross bond
8. Raking bond
9. Zigzag bond
10. Garden wall bond

1. STRETCHER BOND

Longer narrow face of the brick is called as stretcher as shown in the elevation of figure below. Stretcher bond, also called as running bond, is created when bricks are laid with only their stretchers showing, overlapping midway with the courses of bricks below and above. Stretcher bond in the brick is the simplest repeating pattern. But the limitation of stretcher bond is that it cannot make effective bonding with adjacent bricks in full width thick brick walls. They are suitably used only for one-half brick thick walls such as for the construction half brick thick partition wall. Walls constructed with stretcher bonds are not stable enough to stand alone in case of longer span and height. Thus they Then need supporting structure such as brick masonry columns at regular intervals. Stretcher bonds are commonly used in the steel or reinforced concrete framed structures as the outer facing. These are also used as the outer facing of cavity walls. Other common applications of such walls are the boundary walls, gardens etc.

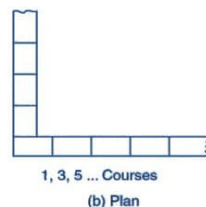
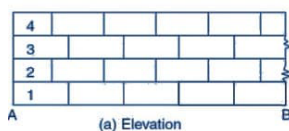


Fig-1: Stretcher Bond

2. HEADER BOND

Header is the shorter square face of the brick which measures 9cm x 9cm. Header bond is also known as heading bond. In header bonds, all bricks in each course are placed as headers on the faces of the walls. While Stretcher bond is used for the construction of walls of half brick thickness whereas header bond is used for the construction of walls with full brick thickness which measures 18cm. In header bonds, the overlap is kept equal to half width of the brick. To achieve this, three quarter brick bats are used in alternate courses as quoins.

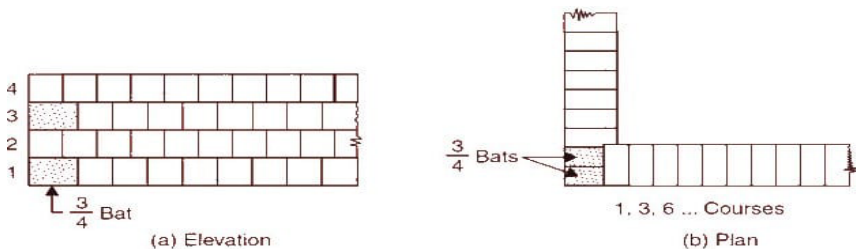


Fig-2: Header Bond

3. ENGLISH BOND

English bond in brick masonry has one course of stretcher only and a course of header above it, i.e. it has two alternating courses of stretchers and headers. Headers are laid centered on the stretchers in course below and each alternate row is vertically aligned. To break the continuity of vertical joints, quoin closer is used in the beginning and end of a wall after first header. A quoin close is a brick cut lengthwise into two halves and used at corners in brick walls.

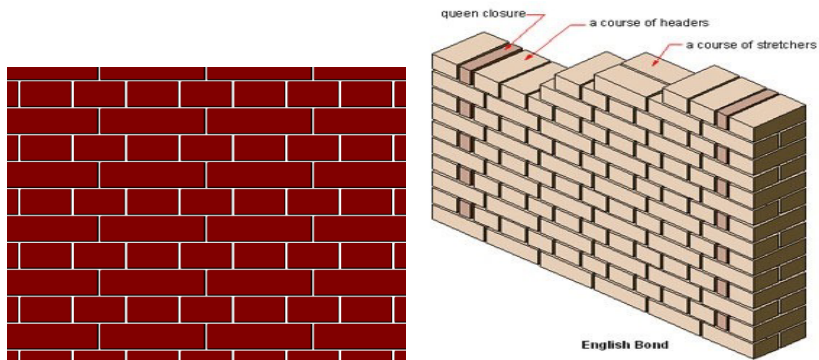


Fig-4: English Bond – Isometric View

4. FLEMISH BOND

For the breaking of vertical joints in the successive courses, closers are inserted in alternate courses next to the quoin header. In walls having their thickness equal to odd number of half bricks, bats are essentially used to achieve the bond. Flemish bond, also known as Dutch bond, is created by laying alternate headers and stretchers in a single course. The next course of brick is laid such that header lies in the middle of the stretcher in the course below, i.e. the alternate headers of each course are centered on the stretcher of course below. Every alternate course of Flemish bond starts with header at the corner. The thickness of Flemish bond is minimum one full brick. The disadvantage of using Flemish bond is that construction of Flemish bond is difficult and requires greater skill to lay it properly as all vertical mortar joints need to be aligned vertically for best effects. For the breaking of vertical joints in the successive courses, closers are inserted in alternate courses next to the quoin header. In walls having their thickness equal to odd number of half bricks, bats are used to achieve the bond. Flemish bonds have better appearance but are weaker than English bonds for load bearing wall construction. Thus, if the pointing has to be done for brick masonry walls, then Flemish bond may be used for better aesthetic view. If the walls have to be plastered, then it is better to use English bond.

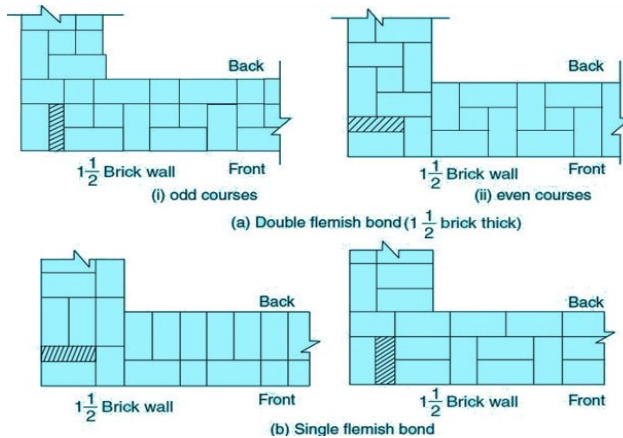
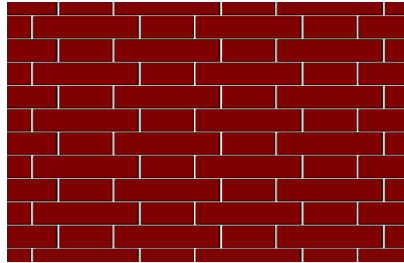


Fig-5: Flemish Bond

Flemish bonds are classified as:

- Single Flemish Bond
- Double Flemish Bond

Single Flemish bond is a combination of English bond and Flemish bond. In this type of construction, the front exposed surface of wall consists of Flemish bond and the back surface of the wall consists of English bond in each course. Minimum thickness required for single Flemish bond is one and a half brick thickness. The main purpose of using single Flemish bond is to provide greater aesthetic appearance on the front surface with required strength in the brickwork with English bond. Double Flemish Bond has the same appearance both in the front and back elevations, i.e. each course consists of alternate header and stretcher. This type of bonding is comparatively weaker than

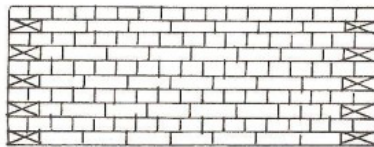
English bond.

5. FACING BOND

This arrangement of bricks is adopted for thick walls, where the facing and backing are desired to be constructed with bricks of different thickness. This bond consists of heading and stretching courses so arranged that one heading comes after several stretching courses. Since the number of joints in the backing and facing differ greatly, the load distribution is not uniform. This may lead to unequal settlement of walls.

6. DUTCH BOND

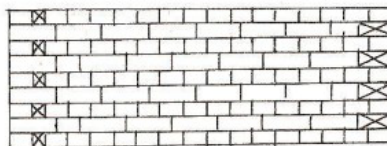
This bond is a modification of old English bond and consists of alternate headers and stretchers. In this arrangement of brick work, each stretching course starts at the quoin with $\frac{3}{4}$ bats and every alternate stretching course has a header placed next to the $\frac{3}{4}$ quarter brick bat provided at the quoin.



Elevation of a wall in Dutch bond

7. ENGLISH CROSS BOND

This is similar to English bond and consists of alternate courses of headers and stretchers. However in this bond, queen closer are introduced next to quoin headers and each alternate course of stretcher has header placed next to quoin stretcher. This bond is sufficiently strong and bears good elevation.

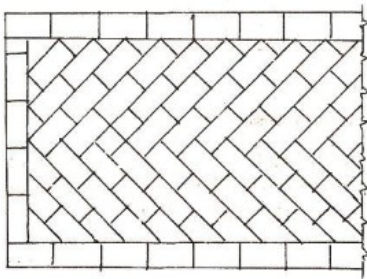


Elevation of wall in English cross-bond.

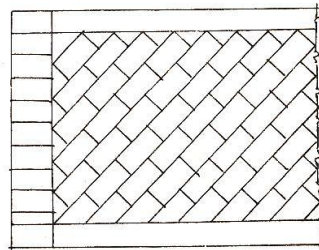
8. RAKING BOND

This is a bond in brick in which the bonding bricks are laid at any angle other than zero or 90 degrees. This arrangement helps to increase the longitudinal stability of thick walls built in English bond. In this arrangement, the space between the external stretchers of wall is filled with bricks inclined to the face of the wall. These are of two common forms:

- a) Herring bone bond: - in this type, the bricks are laid in courses inclined at 45 degrees in two directions from center. It is commonly used for brick paving.
- b) Diagonal bond: - in this type, bricks are placed end to end in such a way that extreme corners of the series remain in contact with the stretchers. It is usually introduced at every 5th or 7th course along the height of wall.



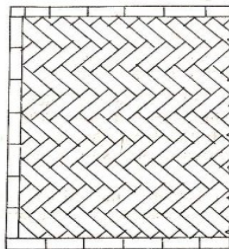
Plan showing arrangement of bricks in Herring-bone bond.



Plan showing arrangement of bricks in Diagonal bond

9. ZIGZAG BOND

This is similar to herring bond with the only difference that in this bond the bricks are laid in zig-zag fashion. This is commonly adopted in brick paving flooring.



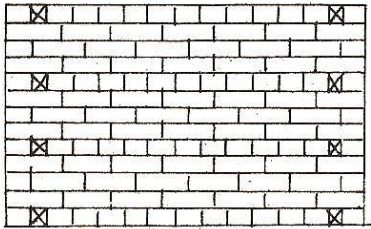
Zig-Zag Bond - Plan

10. GARDEN WALL BOND

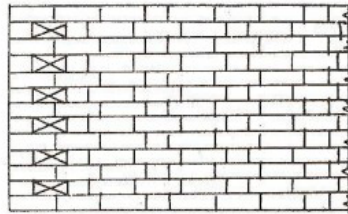
This type of bond suitably adopted for one brick thick wall which may act as a garden wall. In garden wall bond, it is possible to build uniform faces of wall without much labor. This type of bond is not as strong as English bond and its use is restricted to the construction of dwarf walls. For good appearance, this wall is used for construction of the outer leaves of the cavity walls. It can be of two types

a) English garden wall bond: - In this type, a header course is laid only after 3 courses of stretcher bond. A queen closer is placed in every header course after the quoin header.

b) Flemish garden wall bond: - In this type, alternate course composed of one header to 3-5 stretchers throughout the length.



Elevation of a wall in English
garden wall bond



Elevation of wall in Flemish
garden wall bond