Brick Masonry
Brick

• Brick is a basic building unit which is in the form of rectangular block in which length to breadth ratio is 2 but height can be different.
• Normal size (nominal size)
  • 9"×4½" ×3"
• Architectural size (Working size)
  • 8⅛" x 4⁵⁄₁₆" x 2⅞"
• **Brick Masonary**

  The art of laying bricks in mortar in a proper systematic manner gives homogeneous mass which can withstand forces without disintigration, called brick masonry.
Key
1 Length  2 Width  3 Height
4 Bed  5 Face  6 Header

NOTE: This relates to the normal use of the masonry unit in the wall.
**Terminology:**

The surfaces of a brick have names:

- Top and bottom surfaces are beds.
- Ends are headers and header faces.
- Sides are stretchers or stretcher faces.

Bricks are the subject of British Standard BS 3921.
Brick Sizes

A standard metric brick has coordinating dimensions of **225 x 112.5 x 75 mm** (9"×4½" ×3") called nominal size and working dimensions (actual dimensions) of **215 x 102.5 x 65 mm** (8.5“ * 4 *2.5) called architectural size.
Brick Sizes

- Length: 215mm
- Width: 102.5mm
- Height: 65mm
Brick Sizes

- Work size
- Co-ordinating size
The **coordinating dimensions** are a measure of the physical space taken up by a brick together with the mortar required on one bed, one header face and one stretcher face.

The **working dimensions** are the sizes to which manufacturers will try to make the bricks.

- Methods of manufacture for many units and components are such that the final piece is not quite the size expected but it can fall within the defined limits.

- This can be due to the things like shrinkage, distortion when drying out, firing etc.
The difference between the working and coordinating dimensions of a brick is \textbf{10mm (0.5“)} and this difference is taken up with the layer of mortar into which the bricks are pressed when laying.

The working dimensions are also known as the nominal size of a brick.
WORK SIZE = co-ordinating size minus nominal 10mm joint

CO-ORDINATING SIZE
(used for design and setting out)

ACTUAL SIZE
(as measured)
Frog

- The depression provided in the face of a brick during its manufacturing.
- Depth of frog in a brick 10 to 20mm
- Frog should be upward. Why?

Course

Each horizontal layer of bricks laid in mortar in any brick work is called coarse.
Mortar Joints

Mortar placed horizontally below or on the top of a brick is called a bed. Mortar placed vertically between bricks is called a perpend.
Bats

• The portions mad by cutting standard bricks across their width are known as brick bats.
• These are named according their fraction of full length of a standard brick.
Closers

• The portions made by cutting across their length in such a manner that their one stretcher face remains uncut or half cut.

• Queen closer  King closer
Quoins

- The external corners of walls are called quoins.
- The brick which form the external corner is known as quoin brick.

![Diagram of a brick wall with labeled parts: face, back, Quoin Header, Quoin stretcher. Note: material which formed face called facing, material which formed back called backing.]
Types of Brick by Shape

I. **Solid bricks**
Solid brick shall not have holes, cavities or depressions.
II. **Perforated bricks**

*Perforated brick* shall have holes not exceeding the 25% of the gross volume of the brick; minimum 30% solid across the width of brick.
perforated bricks
III. **Frogged bricks**

Frogged bricks shall have depressions in one or more bed faces but their total volume shall not exceed 20% of gross volume of a brick.
IV. **Cellular Bricks**

**Cellular Bricks** have cavities or depressions exceeding 20% of the volume in total.
Masonry Wall Requirements

The usual functional requirements of a masonry wall include:

i) Adequate strength to support imposed loads
ii) Sufficient water tightness
iii) Sufficient visual privacy and sound transmission
iv) Appropriate fire resistance
v) Ability to accommodate heating, air conditioning, electrical, and plumbing equipment
vi) Ability to receive various finish materials
Cost
vii) Ability to provide openings such as doors and window
Bonds In Bricks

- The arrangement of bricks in brick work so that the vertical joints do not come over each other.
- Bonds in brick work is provided to achieve a united mass as soon as practicable to suit the length, height and thickness of brick work and stresses to which it is subjected.
• To break the continuity of vertical joints and to provide proper bond in brick masonry portion of brick (closers or bats) are provided in alternative courses.
Brick Bonds:

Common types used in Pakistan are:

i. Stretcher Bond
ii. Header Bond
iii. English Bond
iv. Flemish Bond
I. Stretcher Bond

**Stretcher/Common Bond**

Only used for walls of half brick thickness (partition wall), this is the only practical bond which can be used on a wall of this thickness. To break the vertical continuity $\frac{1}{2}$ brick bat is provided in alternating courses.
Header Bond also known as Spanish bond) was a very common bond for bearing walls. It is composed of header bricks, set in rows that are offset \( \frac{3}{4} \) of a brick as a quoin brick in alternating courses, which produces a solid easy to lay bond.
English Bond

• The strongest bond
• This bond maximizes the strength of wall
• Pattern on the face of the wall shows distinctive courses of headers & stretchers.
Queen closer
heading coarse
straching coarse
Quoin header
English bond
Flemish Bond

- Not such a strong as English bond
- Decorative pattern on face of the wall shows alternate headers & stretchers in each with the headers centered under and over stretchers in adjacent courses.
• In this bond a queen closer is provided after every queen header in the alternate courses to break the continuity of vertical joints.

• Brick bats are to be used for forming this bond when thickness of wall is multiple of half brick.
Flemish Bond alternates headers and stretchers in each course
• Assignment

  What is reinforced brick masonry. when is the brickwork reinforced? and its advantages and disadvantages.