

BRICKS

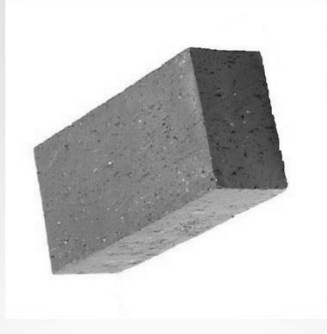
Manufacturing of bricks

1. Preparation of brick earth
2. Moulding
3. Drying
4. Burning



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- It is the oldest and most common building material because of its strength, low cost and easy availability.
- They are made of soil and hence its properties depends on the properties of soil.
- Indian standard size of modular bricks is 19cm x 9cm x 9cm
- With mortar joints, the size will be 20cm x 10cm x 10cm. It is called nominal size.



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Classification of bricks

1. Unburnt or sun dried bricks
2. Burnt bricks
 - i. First class bricks
 - ii. Second class bricks
 - iii. Third class bricks
 - iv. Fourth class bricks (over burnt bricks)

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Constituents of good brick earth

- **Alumina:** should contain about 20-30% of alumina. It imparts plasticity to earth so that it can be moulded. If present in excess, raw bricks shrink and warp during drying and burning.
- **Silica:** 50-60% of total matter in brick earth. It prevents shrinkage and warping. It imparts uniform shape to the bricks. Excess silica makes the brick brittle
- **Lime:** not exceeding 5%. Presence of lime assists the fusion of sand at high temperature in kiln.
- **Oxides of iron:** helps to bind the particles and also imparts red colour to the bricks.
- **Magnesia:** Less than 2%. It decreases shrinkage.

Classification of bricks

Second class bricks

- Bricks with slight irregularities in shape, size, colour and finish.
- Slightly over burnt.
- Ground moulded and burnt in kilns
- Should not absorb water more than 22% of its dry weight when immersed in water for 24 hours
- Minimum compressive strength should be 7 N/mm²
- Used for internal walls
- Brickwork with second class bricks should be plastered.

Classification of bricks

Un burnt bricks

- Dried under sun light
- Used for temporary and cheap construction works.
- Also used for filling works

Classification of bricks

Third class bricks

- Not burnt properly (slightly under burnt or over burnt)
- Ground moulded and burnt in clamps.
- Light red colour with yellowish tint
- Should not absorb water more than 24% of its dry weight when immersed in water for 24 hours.
- Minimum compressive strength should be 3.5 N/mm²
- Used for unimportant and temporary works

Classification of bricks

First class bricks

- Well burnt bricks with smooth and even surface with perfect rectangular shape
- Machine moulded, burnt in kilns and has uniform reddish colour
- Should not absorb water more than 20% of its dry weight when immersed in water for 24 hours
- When struck with another brick, should produce a metallic ringing sound
- Should not leave any mark when scratched with fingernail.
- When broken into pieces, broken face should have a compact structure.
- Minimum compressive strength should be 10.5 N/mm²
- Used for superior quality works such as outer walls and facing works
- Should be laid in rich mortar

Qualities of good bricks

9. Should not break when dropped from a height of about 1m
10. Compressive strength should not be below 3.5 N/mm²
11. Should have good sound and heat insulation properties.

Classification of bricks

Fourth class bricks

- Over burnt bricks
- Dark in colour with irregular size and shape
- Not used for building construction
- Used as aggregate in concrete and for flooring.

Laboratory tests on bricks

1. Crushing strength test

- Test is conducted by using CTM
- Brick is placed on the platform of the CTM and load is applied gradually
- Breaking load is noted
- Compressive strength of brick should not be less than 3.5 N/mm²

Crushing strength = breaking load / area of brick where load is applied

Qualities of good bricks

1. Should have uniform colour
2. Should be free from voids, cracks and grits
3. Should have even surfaces with sharp and square edges
4. Should be of standard size
5. When broken, should show homogeneous structure
6. Should be hard, ie. No impression should be left when scratched with finger nails.
7. Should give metallic sound when knocked against one another
8. Should not absorb water more than 20%

Field tests on bricks

1. Shape and size test

- Bricks are randomly selected and their shape and size can be checked to see if they conform to the standard shape and size

2. Hardness test

- To find out the hardness of brick
- Brick surface is then scratched on the surface by using a fingernail
- If there is no impression left on the surface, then the brick is hard

Laboratory tests on bricks

2. Water absorption test

- To find out the amount of water absorbed by brick
- Dry weight of the brick is noted
- Then immersed in water for 24 hrs
- After that, brick is taken out and weight is noted

Water absorption = $\frac{\text{wet weight} - \text{dry weight}}{\text{dry weight}} \times 100$

Field tests on bricks

3. Soundness test

- Two bricks are taken and knocked with each other
- Good quality brick will produce a clear metallic ringing sound

4. Toughness test

- Brick is taken and dropped from a height of 1m
- Good brick won't break

5. Structure test

- When brick is cut into two pieces and observed, it should be homogeneous, compact and free from holes & lumps, etc.

Laboratory tests on bricks

3. Test for the presence of soluble salt

- To find out the presence of efflorescence in the brick
- Efflorescence may occur due to the presence of soluble salt
- The brick is first immersed in water for 24 hrs
- Then it is taken out and dried under shade
- After drying, if there is any presence of white or grey powder on the brick surface, then it indicates the presence of soluble salt (efflorescence)

Uses of bricks

- Used for construction of walls, foundations of structure etc.
- Used for the construction of bridges, dams etc.
- Used for paving and road works
- Fire bricks are used for chimneys, furnaces etc.
- Bricks are also used for ornamental works