Bricks

Lecture - 2

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2. Quality Classification of Bricks
3. Testing of Bricks as Per Indian Standards
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Characteristic of Good Bricks

Bricks should be table moulded, well burnt in kilns, copper coloured, free from cracks and with sharp and square edges.

(ii) Bricks should be uniform shape and should be of standard size.

(iii) Bricks should give clear ringing sound when struck each other.

(iv) Bricks when broken should show a bright homogeneous and compact structure free from voids.

(vi) Bricks should be sufficiently hard no impression, should be left on brick surface, when it is scratched with finger nail.

(vii) Bricks should be low thermal conductivity and they should be sound proof.

Characteristic of Good Brick Earth

(Viii) Bricks should not break when dropped flat on hard ground from a height of about one meter.

(ix) Bricks, when soaked in water for 24 hours, should not show deposits of white salts when allowed to dry in shade.

(x) No brick should have crushing strength below 10N/mm^2

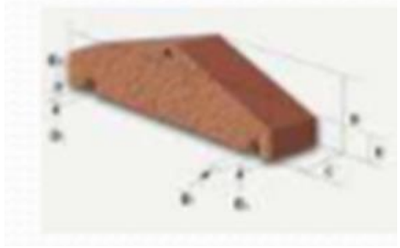
(x) Bricks should not absorb water more than 20 percent by weight for first class bricks and 22 percent by weight for second class bricks, when soaked in cold water for a period of 24 hours.

Shape of Bricks

The ordinary bricks are rectangular solids. But sometimes the bricks are given different shapes to make them suitable for particular type of construction. Different types of bricks available with various shapes;

BullNose Bricks

Channel Bricks



Coping Bricks

Cownose Bricks

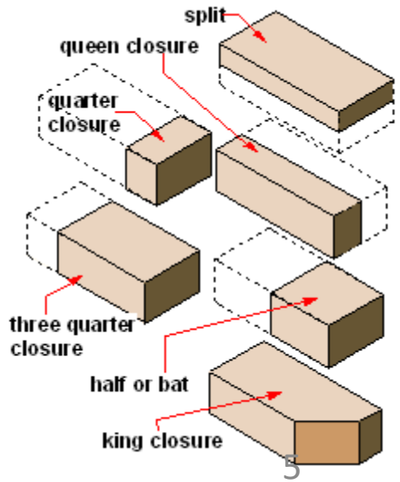
Curved Sector Bricks

Purpose made Bricks

Hollow Bricks

Paving Bricks

Perforated Bricks



http://civilconstructiontips.blogspot.com/2011/06/bonding-at-angles-and-jambs-walls.html
http://www.builderbill-diy-help.com/brick-closures.html

Quality Classification of Burnt Bricks

On the basis of field practice

On the basis of field practice the bricks are classified as First Class, Second Class, Third Class, Fourth Class.

Uses: First class bricks are recommended for pointing, exposed face work in masonry structures, flooring and reinforced brick work.

First Class Bricks

- These are thoroughly burnt and are of deep red, cherry or copper colour.
- Surface should be smooth and rectangular, with parallel, sharp and straight edges and square corners.
- These should be free from flaws, cracks and stones.
- These should have uniform texture.
- No impression should be left on the brick when a scratch is made by a finger nail.
- The fractured surface of the brick should not show lumps of lime.
- A metallic or ringing sound should come when two bricks are struck against each other.
- Water absorption should be 12–15% of its dry weight when immersed in cold water for 24 hours.
- The crushing strength of the brick should not be less than 10 N/mm2. This limit varies with different Government organizations around the country.

Quality Classification of Burnt Bricks

On the basis of field practice

Uses: Second class bricks are recommended for all important or unimportant hidden masonry works and centering of reinforced brick and reinforced cement concrete (RCC) structures.

Second Class Bricks are supposed to have the same requirements as the first class ones except that

- Small cracks and distortions are permitted.
- A little higher water absorption of about 16–20% of its dry weight is allowed.
- The crushing strength should not be less than 7.0 N/mm2.

Third Class Bricks

Uses : It is used for building temporary structures.

- These are underburnt bricks . They are soft and light-coloured producing a dull sound when struck against each other. Water absorption is about 25 per cent of dry weight.

Fourth Class Bricks

Uses: The ballast of such bricks is used for foundation and floors in lime concrete and road metal.

- are overburnt and badly distorted in shape and size and are brittle in nature.

Quality Classification of Burnt Bricks

On the basis of Strength

The Bureau of Indian Standard (BIS) has classified the bricks on the basis of compressive strength (IS 1077)

Class Designation	Average Compressive Strength not less than (N/mm^2)
35	35
30	30
25	25
20	20
17.5	17.5
15	15
12.5	12.5
10	10
7.5	7.5
5	5
3.5	3.5

Quality Classification of Burnt Bricks

On the basis Use

Common Bricks

Common brick is a general multi-purpose unit manufactured economically without special reference to appearance. These may vary greatly in strength and durability and are used for filling, backing and in walls where appearance is of no consequence.

Facing Bricks

Facing Bricks are made primarily with a view to have good appearance, either of colour or texture or both. These are durable under severe exposure and are used in fronts of building walls for which a pleasing appearance is desired.

Engineering Bricks

EB are strong, impermeable, smooth, table moulded, hard and conform to defined limits of absorption and strength. These are used for all load bearing structures.

Quality Classification of Burnt Bricks

On the basis of Finish

Sand Faced Bricks

These bricks have textured surface manufactured by sprinkling sand on the inner surfaces of the mould.

Rusting Bricks

These Bricks have mechanically textured finish, varying in pattern

On the basis of manufacture

Hand Made Bricks

These bricks are hand moulded.

Machine Made Bricks

wire-cut bricks—bricks cut from clay extruded in a column and cut off into brick sizes by wires;
Pressed bricks— when bricks are manufactured from stiff plastic or semi-dry clay and pressed into moulds
moulded bricks—when bricks are moulded by machines imitating hand mixing.

Quality Classification of Burnt Bricks

On the basis of Burning

Pale Bricks

These are underburnt bricks obtained from outer portion of the kiln.

Body Bricks

These are well burnt bricks occupying central portion of the kiln.

Arch Bricks

These are overburnt also known as clinker bricks obtained from inner portion of the kiln.

Quality Classification of Burnt Bricks

On the basis of Types

Solid Bricks

Small holes not exceeding 25 per cent of the volume of the brick are permitted; alternatively, frogs not exceeding 20 per cent of the total volume are permitted..

Perorated Bricks

Small holes may exceed 25 per cent of the total volume of the brick

Hollow Bricks

The total of holes, which need not be small, may exceed 25 per cent of the volume of the brick.

Cellular Bricks

Holes closed at one end exceed 20 per cent of the volume

Tests for Bricks Quality Evaluation

Water Absorption Test

- The bricks to be tested should be dried at temperature of 105° C to 115° C.
- Take weight of dried brick W1.
- Immerse completely dried brick in clean water for 24 hours at room temperature.
- Remove the bricks and wipe out and weight immediately (W2).

$$Water\ absorption\ in\ \%\ by\ weight = \frac{W2 - W1}{W1} \times 100$$

A good brick should not absorb more than 20% of water by weight, when placed in water for 24 hours

IS 3495 (Part 2):1992 'Methods of Tests of Burnt Clay Building Bricks'

Tests for Bricks Quality Evaluation

Compressive Strength Test

- Immerse in water at room temperature for 24 hours. Take out the specimen and remove the surplus moisture. Fill the frog with 1:3 mortar. Store under the damp jute bags for 24 hours followed by immersion in clean water for 3 days.
- Place the flat surface upwared and apply the load axially at a uniform rate of 14 N/mm2 per minute till the failure occures and note the maximum load at failure

$$Compressive\ strength\ (N per\ mm^2) = \frac{Maximum\ loat\ at\ failure\ in\ N}{Average\ area\ of\ the\ bed\ faces\ in\ mm^2}$$

Common building bricks shall have a minimum strength of 35 kg per sq cm when tested.

IS 3495 (Part 1):1992 'Methods of Tests of Burnt Clay Building Bricks'

Tests for Bricks Quality Evaluation

Efflorescence Test

- Place the end of the bricks in the dish, the depth of immersion in water being 25 mm. Place the whole arrangement in a warm (for example, 20 to 30°C) well ventilated room until all the water in the dish is absorbed by the specimens. and the surplus water evaporates
- When the water has been absorbed and bricks appear to be dry, place a similar quantity of water in the dish and allow it to evaporate as before. Examine the bricks for efflorescence after the second evaporation and report the results.

The liability to efflorescence shall be reported as nil, slight, moderate, heavy and serious in IS 3495 part 3-1992

IS 3495 (Part 3):1992 'Methods of Tests of Burnt Clay Building Bricks'

Indian Standard code for Brick

IS 1077 : 1992
(Reaffirmed 2002)

भारतीय मानक

REAFFIRMED
2007

भवन निर्माण की सामान्य पकी मिट्टी की ईटों की विशिष्टि

(पाँचवा पुनरीक्षण)

Indian Standard

COMMON BURNT CLAY BUILDING BRICKS - SPECIFICATION

(Fifth Revision)

Fourth Reprint JANUARY 2005

UDC 666.762.712

Describe the size of modular and non modular bricks

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

January 1992

Price Group 2

IS 3495 (Parts 1 to 4) : 1992
(Reaffirmed 2002)

भारतीय मानक

निर्माण के लिए पक्की मिट्टी की ईटों की परीक्षण पद्धति

भाग 1 संपीडन सामर्थ्य ज्ञात करना
भाग 2 जल अवशोषण ज्ञात करना
भाग 3 उत्फुल्लन ज्ञात करना
भाग 4 विकुंचता ज्ञात करना

(तीसरा पुनरीक्षण)

Indian Standard

METHODS OF TESTS OF BURNT CLAY BUILDING BRICKS

PART 1 DETERMINATION OF COMPRESSIVE STRENGTH
PART 2 DETERMINATION OF WATER ABSORPTION
PART 3 DETERMINATION OF EFFLORESCENCE
PART 4 DETERMINATION OF WARPAGE

(Third Revision)

Third Reprint OCTOBER 1998

UDC 666 712 : 620·1

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

May 1992

Price Group 4

Summary

- *Characteristics of Good Bricks*
- *Quality Classification of Burnt Bricks*
- *Testing of Bricks*
- *Indian Standard Code for Bricks*

THANK YOU