TESTS ON BRICKS

a. COMPRESSION STRENGTH OF BRICK

Exp.No .......... Date : ...........

AIM

To determine the compressive strength of burnt clay building blocks

THEORY

Brick are mostly subjected to compression and rarely to tension. The usual crushing strength of common hand molded well burnt brick is about 5 to 10 N/mm² (50 to 100kg/cm²) varying according to the nature of preparation of the clay. Pressed and machine molded bricks made of thoroughly mixed clay are much stronger than common hand mould bricks made from carelessly prepared clay.

APPARATUS

Compressive strength testing machine

Preparation of Test specimens

Remove unevenness observed in the bed faces to provide two smooth and parallel faces by grinding. Immerse in water at room temperature for 21 hours. Remove the specimen and drain out any surplus moisture at room temperature. Fill the frog ( where provided ) and all voids in the bed face flush with cement mortar (1 cement, clean coarse sand of grade 3 mm and down ). Store under the damp jute bags for 24 hours followed by immersion in clean water for 3 days. Remove, and wipe out any traces of moisture.

PROCEDURE

Measure dimension nearer to 1mm.Place the specimen with flat faces horizontal, and mortar filled face facing upwards between two 3-ply plywood sheets each of 3 mm thickness and carefully centered between plates of the testing machine. Apply load axially at a uniform rate of 14 N/mm² (140 kgf/cm²) per minute till failure occurs and note the maximum load at failure. The
load at failure shall be the maximum load at which the specimen fails to produce any further increase in the indicator reading on the testing machine.

**OBSERVATIONS**

<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>Dimensions of brick (cm)</th>
<th>Area of bed (cm²)</th>
<th>Maximum load (t)</th>
<th>Compressive strength (N/mm²)</th>
</tr>
</thead>
</table>

Compressive strength = \( \frac{\text{Maximum load at failure (N)}}{\text{Area of average bed face (mm²)}} \)

Average compressive strength = 

**Range calculation:**

Maximum compressive strength = 
Contact area = 
Maximum expected load = 
The range to be selected = 

**SPECIFICATIONS**

The standard size of common building bricks shall be as follows:
Dimensions:

<table>
<thead>
<tr>
<th>Length(mm)</th>
<th>Breadth(mm)</th>
<th>Height(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>190</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>190</td>
<td>90</td>
<td>40</td>
</tr>
</tbody>
</table>

Classification: The common burnt clay bricks shall be classified on the basis of average compressive strength as given in table

Table 1 (IS :1077-1992)

<table>
<thead>
<tr>
<th>Class designation</th>
<th>Average compressive strength (N/mm²)</th>
<th>Not less than kgf/cm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>35</td>
<td>350</td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>300</td>
</tr>
<tr>
<td>25</td>
<td>25</td>
<td>250</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>200</td>
</tr>
<tr>
<td>17.5</td>
<td>17.5</td>
<td>175</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>150</td>
</tr>
<tr>
<td>12.5</td>
<td>12.5</td>
<td>125</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>7.5</td>
<td>7.5</td>
<td>75</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>3.5</td>
<td>3.5</td>
<td>35</td>
</tr>
</tbody>
</table>
**OBSERVATIONS**

<table>
<thead>
<tr>
<th>Weight of wet brick $M_2$ (kg)</th>
<th>Weight of dry brick $M_1$ (kg)</th>
<th>Water absorption percentage(%)</th>
</tr>
</thead>
</table>

Water absorption $= \frac{(M_2 - M_1)}{M_1} \times 100$

$M_1 =$ Weight of dry brick

$M_2 =$ Wet weight of brick

Average percentage absorption $= $

**RESULT**

The compressive strength of brick $= $

**REFERENCE**

b. DETERMINATION OF WATER ABSORPTION

Exp.No .......... Date : ..........

AIM

To determine water absorption of burnt clay building bricks.

REFERENCE

IS: 3495 (part 2) -1992

THEORY

Brick for external use must be capable of preventing rain water from passing through them, to inside of the wall of reasonable thickness. A good brick should

APPARATUS

A sensitive balance capacity of weighing within 0.1% of specimen; and ventilated oven.

PROCEDURE

Immerse completely dried specimen in clean water at a temperature of 27 ± 2°C for 24 hours. Remove the specimen and wipe out any traces of water with a damp cloth and weigh the specimen. Complete the weighing 3 minutes after the specimen has been removed from water. absorb water, maximum 1/7th of the weight of the brick.

RESULT

The water absorption of burnt clay building brick =

SPECIFICATION

As per IS 1077: 1992 water absorption of brick of class up to 12.5 should not exceed 20% and 15% for higher class.
c. DETERMINATION OF EFFLORESCENCE

Exp.No .......... Date : ..........

AIM
To determine efflorescence of burnt clay building brick.

REFERENCE
IS: 3495 (Part3)-1992

THEORY
Sodium and potassium salts present in bricks get dissolved in the absorbed water and when evaporation takes place the concentration of salt increases until a point is reached when salt crystallizes out. This point largely depend on the capillary properties of material.

APPARATUS
A shallow bottom dish containing sufficient distilled water to completely saturate the specimens. The dish shall be made of glass, porcelain or glazed stoneware and of size 180 mm X 180 mm X 40 mm depth for square shaped and 200 mm dia X 40 mm depth for cylindrical shaped.

PROCEDURE
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 well ventilated room until all the water in the dish is absorbed by the specimens and the surplus water evaporates. Cover the dish containing the brick with suitable glass cylinder so that excessive evaporation from the dish may not occur. 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.
SPECIFICATION

As per IS 1077 : 1992 rate of efflorescence shall not be more than moderate up to class 12.5 and slight for higher classes.

RESULT

Given brick has ............ efflorescence.