MATTEST
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Brick Testing

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CONTENTS

DIMENSIONAL TOLERANCE (BRICKS)

STANDARD: IS: 1077-1992 (RA 2011)

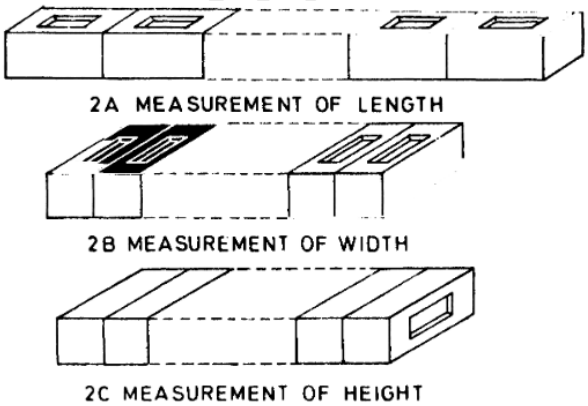
- This standard covers the procedure for determining the whether the bricks used for construction are of specified dimensional tolerance.

APPARATUS

- A measuring steel tape.

PROCEDURE

- Select 20 or more bricks at random from the stack.
- Remove all the blisters, loose particles of clay and small projections from the surface of bricks.
- Arrange a specimen of 20 bricks upon a level surface successively in contact with each other and in straight line as per 2A, 2B & 2C below for measurement of Length, width & height respectively.
- The overall length of the assembled bricks shall be measured with a steel tape sufficiently long to measure the whole row at one stretch.



MEASUREMENT OF TOLERANCES OF COMMON BUILDING BRICKS

ACCEPTABILITY

The actual dimensions of bricks when tested should be within the following limits per 20 bricks:

Modular Bricks:

- Length 3800 ± 80 mm
- Width 1800 ± 40 mm
- Height 1800 ± 40 mm (For 90 mm high bricks)
  800 ± 40 mm (For 40 mm high bricks)

Non –modular Bricks:

- Length 4600 ± 80 mm
- Width 2200 ± 40 mm
- Height 1400 ± 40 mm (For 70 mm high bricks)
  600 ± 40 mm (For 30 mm high bricks)

COMPRESSIVE STRENGTH OF BRICKS

STANDARD: IS: 3495 (Part-1) - 1992, (RA 2011)

- This standard (Part 1) covers the procedure for determining of compressive strength of burnt clay building bricks.

FOR SOLID BRICKS

APARATUS

- Compression testing machine

PRECONDITIONING

- 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

- 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/mm* (140 kgf/cm^2) 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.

NOTE

- In place of plywood sheets plaster of Paris may be used to ensure a uniform surface for application of load.

REPORT

- The report shall be as given below

$$\text{Compressive strength in } \frac{\text{N}}{\text{mm}^2}\left(\frac{\text{kgf}}{\text{cm}^2}\right) = \frac{\text{Maximum load at failure in N(kgf)}}{\text{Average area of the bed faces in mm}^2\ (\text{cm}^2)}$$

- The average of results shall be reported.

FOR PERFORATED BRICKS

APARATUS

- Compression testing machine.

PRECONDITIONING

- Immerse the specimen in water at room temperature for 24 hours.
- Remove the specimen from water and drain out any surplus water.
- No mortar shall be filled in perforations and no mortar capping shall be provided.

PROCEDURE

- Place the perforated faces of the brick between two 3-ply plywood sheets each of 3 mm thickness and carefully centred between the plates of the testing machine.

- Apply the load axially at uniform rate of 14 N/mm² (140 kgf/cma) per minute till the failure occurs and notes 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.

NOTE

- In place of plywood sheets plaster of Paris may be used to ensure a uniform surface application of load.

REPORT

- The report shall be as given below:

$$\text{Compressive strength in } \frac{\text{N}}{\text{mm}^2}\left(\frac{\text{kgf}}{\text{cm}^2}\right) = \frac{\text{Maximum load at failure in N(kgf)}}{\text{Average net area of the two faces under compression in mm}^2\ (\text{cm}^2)}$$

- The average of results shall be reported.

WATER ABSORPTION OF BRICKS

STANDARD: IS: 3495 (Part-2) - 1992 (RA 2011)

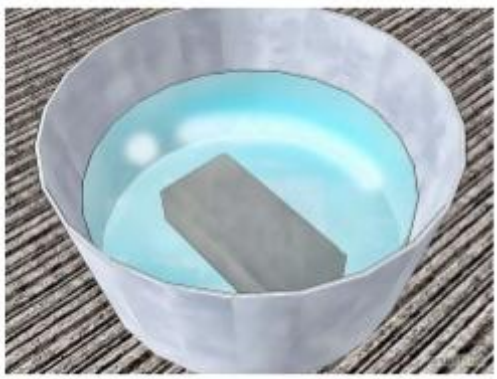
- This standard (Part 2) covers the procedure for determining the water absorption of burnt clay building bricks.

GENERAL

- The dimension shall be measured to the nearest 1 mm.
- All apparatus and testing equipment shall be calibrated at frequent intervals.
- The number of specimens for the test shall be selected according to IS 5454: 1976.

APARATUS

- A sensitive balance capable of weighing within 0.1 percent of the mass of the specimen; and a ventilated oven.



PRECONDITIONING

- Dry the specimen in a ventilated oven at a temperature of 105 to 115°C till it attains substantially constant mass.
- Cool the specimen to room temperature and obtain its weight (M_1) Specimen warm to touch shall not be used for the purpose.

PROCEDURE

- Immerse completely dried specimen in clean water at a temperature of 27 f 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 (M_2).

REPORT

- Water absorption, percent by mass, after 24-hour immersion in cold water is given by the following formula:
- The report shall be as given below:

$$\textbf{Water absorption } (\%) = \frac{\mathbf{M_2 - M_1}}{\mathbf{M_1}} \textbf{ X 100 } \%$$

EFFLORESCENCE OF BRICKS

STANDARD: IS: 3495 (Part-3) - 1992 (RA 2011)

- This standard (Part 3) covers the procedure for determining the efflorescence of burnt clay building bricks.

GENERAL

- The dimension shall be measured to the nearest 1 mm.
- All apparatus and testing equipment shall be calibrated at frequent intervals.
- The number of specimens for the test shall be selected according to IS 5454: 1976.

APPARATUS

- A shallow flat 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 (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.
- 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 effloresence after the second evaporation and report the results.

REPORT

The liability to efflorescence shall be reported as 'nil', 'slight', 'moderate', 'heavy' or 'serious' in accordance with the following definitions:

- Nil - When there is no perceptible deposit of efflorescence.
- Slight - When not more than 10 percent of the exposed area of the brick is covered with a thin deposit of salts.
- Moderate - When there is a heavier deposit than under 'slight' and covering up to 50 percent of the exposed area of the brick surface but unaccompanied by powdering or flaking of the surface.
- Heavy - When there is a heavy deposit of salts covering 50 percent or more of the exposed area of the brick surface but unaccompanied by powdering or flaking of the surface.
- Serious - When there is a heavy deposit of salts accompanied by powdering and/or flaking of the exposed surfaces.