BDS 208: 2009

Bangladesh Standard

SPECIFICATION FOR COMMON BUILDING CLAY BRICKS
(3rd Revision)

Bangladesh Standards and Testing Institution
Maan Bhaban
116-A, Tejgaon Industrial Area, Dhaka-1208

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Md. Mursaleen Mahfuz Examiner (Engineering)	Bangladesh Standards and Testing Institution, Dhaka.

FOREWORD

01. This standard was adopted by the Bangladesh Standards and Testing Institution on 29.12.2009 after the BDS 208:2002 had been thoroughly reviewed, discussed and approved by the Sectional Committee for Clay Bricks, Hollow Clay Bricks, Clay Ceramic Tiles and Cement Blocks and had been endorsed by the Engineering (Civil) Divisional Committee.

02. This standard was first revised in the year 1980 and the 2nd revision was made in the year 2002. In the revision of this standard due consideration was given to the views and suggestions put foreword by the representative sections of technologists, manufacturers and utilizing agencies.

03. In the revision of this standard assistance has been drawn from the IS 1077, IS 5454 and ASTM C 67 and assistance so derived is acknowledged herein with thanks.

04, This Bangladesh standard is applicable to all common sizes and varieties of building clay bricks including other purpose made bricks of different shapes and sizes. Finished quality standard is common for all bricks.

Bangladesh Standard

SPECIFICATION FOR COMMON BUILDING CLAY BRICKS
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1. SCOPE

This standard lays down requirements for dimensions, strength and other quality requirements of common burnt clay building bricks.

2. TERMINOLOGY

For the purpose of this standard following definitions shall apply

2.1 Bricks

The burnt clay building bricks which are commonly used in building and civil engineering construction purposes.

3. DIMENSIONS

3.1 Size- The standard dimensions of common burnt clay bricks shall be of following:

TABLE 1: SIZE OF BRICKS

Dimension	cm
Length	24
Width	11.5
Height / Depth	7

NOTE- One bedding face of each brick shall have a recess, panel or frog. The size of the frog for the standard brick shall not exceed 13cmx 5cmx 1cm as shown in fig. 1. This would not apply to brick manufactured by extrusion process or any special bricks required by the purchaser.

3.2 Variation - Small variation for Grade A and B in the dimension shall be permissible to the following extent only:

TABLE 2: MAXIMUM PERMISSIBLE VARIATION OF BRICKS

Specified Dimension	Maximum Permissible Variation
Over 5 cm and up to 7.5cm	± 2.0 mm
Over 7.5 cm and up to 10 cm	± 3.0 mm
Over 10 cm and up to 15 cm	± 5.0 mm
Over 15 cm and up to 25 cm	± 6.0 mm

4. CLASSIFICATION

Three grades of bricks have been incorporated based on their strength properties. This will include reasonable variation in the quality of clays available locally.

TABLE 3: CLASSIFICATION OF BRICKS

Grade	Mean for twelve halved bricks	Minimum for individual halved bricks
S	280 kg^f/cm^2	245 kg^f/cm^2
A	175 kg^f/cm^2	154 kg^f/cm^2
B	140 kg^f/cm^2	105 kg^f/cm^2

Grade S: This type of bricks may be used for breaking into aggregate for plain and reinforced concrete and for making base course of pavement.

Grade A: This type of bricks may be used in construction of buildings of long duration.

Grade B: This type of bricks may be used for one storied building, temporary shed, where intended durability is not very long.

5. WATER ABSORPTION

Water absorption by weight shall not exceed 20% for bricks of B grade and 15% for bricks of A grade and 10% for bricks of S grade.

6. MEASUREMENT OF DIMENSION AND SIZE

6.1 Number of Specimens- 24 bricks, for carrying out dimensional tests as per procedure set out in clauses 6.3 to 6.5 of this standard shall be taken.

6.2 Preparation of specimens - Any blister or other small project together with-any loose particles of clay which might have adhered to the face of brick shall be removed before the bricks are assembled for measurement.

6.3 Length- a) 24 Bricks laid end to end on a level surface in contact in a straight line shall measure between 568 cm to 588 cm when all frog face upwards as shown in Figure 2.

b) 24 Bricks laid in a similar manner as in clause 6.3 (a) above but having alternate frogs facing upwards and downwards shall also measure between 568 cm to 588 cm as shown in Figure 3. The difference between the length noted in clause 6.43 (a) above and this system will not be more than 17 mm

6.4 Width- a) 24 Bricks laid side by side on level surface in contact in a straight line shall measure between 281 cm to 291 cm when all frogs face upwards as shown in Figure 4.

b) 24 Bricks laid in a similar manner as in clause 6.4 (a) above but having alternate frogs facing upwards and downwards shall also measure between 281 cm to 291 cm as shown in Figure 5. The difference between the length noted in clause 6.4 (a) and this system will not be more than 8 mm.

6.5 Depth- 24 bricks laid on edge bedding surface to bedding surface on a level surface in contact in a straight line will measure 165 cm to 171 cm

NOTE: - When bricks without frogs are to be measured the system for clauses 6.3 and 6.4 shall be arranged by reversing sides of alternate bricks.

6.6 Measurement- The overall length of the assembled bricks shall be measured with a steel tape of other suitable inextensible measure long enough to measure the whole row at once. Measurement by repeated application of a short rule or measure shall not be considered satisfactory. If, for any reason, it is found impracticable to measure 24 bricks in one row the samples may be divided into two rows of 12 bricks which shall be measured separately to the nearest of l. 5 mm to their measurement added,

6.7 Compliance - If the measurements in clauses 6.3 to 6.5 are fulfilled, the whole consignment from which the sample is drawn shall be deemed to comply with the specification and these specimens shall thereafter be used for other specified tests. If the specimens do not comply, the whole consignments from which the specimens are drawn shall be rejected and no further tests in regard to crushing strength, water absorption and efflorescence are needed to be carried out.

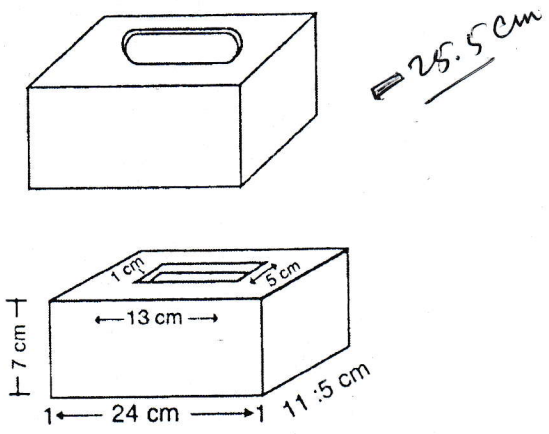

FIG NO. 1

FIG NO. 2

FIG NO. 3

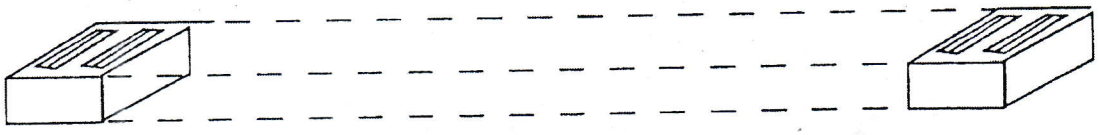

FIG NO. 4

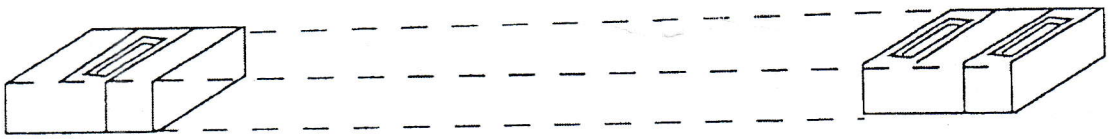

FIG NO. 5

FIG NO. 6

7. DETERMINATION OF CRUSHING STRENGTH

7.1 Specimens – Twelve bricks taken at random from sample shall be halved and one half from each whole brick used for determining the crushing strength as detailed in7.2. The overall dimension of each bedding face shall be measured to the nearest of 1.3 mm and the area of the face having smaller area shall be taken as the area of the bricks for testing the crushing strength.

Sample sizes for crushing strength are as follows:

TABLE 4: SAMPLE SIZE FOR CRUSHING STRENGTH

Lot size	Sample size
2.001 to 10.000	5
10,001 to 35,000	10
35.001 to 50.000	15

7.2 Procedure

Bricks without frogs - These shall be immersed in water at 15°C to 20°C for 24 hours. They shall then be removed and allow to dry at room temperature for about 5 minutes. Their frogs shall be filled with cement sand mortar of 1: 1 ½, sand being clean and well graded passing 3.2 mm sieve. The mortar shall be trowelled off flush with surface of the bricks. The bricks shall then be stored under the damp sacks for 24 hours after filling the frogs and shall then be immersed in water for six days before bricks are considered ready for testing*. After seven days of filling the mortar, specimens will be taken out wiped dry with damp cloth and used plaster of Paris or sulfur capping to ensure a uniform surface of brick for crushing strength test and carefully centered between the plates of the compression testing machine. The compressing plates of the testing machine shall have a blasting in the form of a portion of sphere, the center of each coinciding with the center of the face of the plate. The load shall be applied axially at a uniform rate of 140 kg/cm^2 per minute, until failure.

7.3 Results- Maximum load in kilogram at failure divided by the minimum area of the bedding surface of the half bricks in square centimeter shall be taken as the crushing strength whole limiting values are given in 7.4. The main crushing strength of twelve half bricks along with that of each individual half bricks shall be noted.

7.4 Limiting value - The value of crushing strength in kilogram per square centimeter shall not be less than the figures given in table 3.

7.5 Compliance - If the mean crushing strength of twelve bricks falls below the limiting crushing strength given 7.4 above, the batch from which the sample is taken shall be deemed not to comply. If however, any individual brick gives the crushing strength less than the minimum value for an individual brick given in 7.4 above, the test will be repeated as detailed in Para 7.2 over twice the number of bricks that have failed provided the number of individual brick not complying of any does not exceed clause 4. If on retest them crushing strength of any individual bricks still falls below the minimum value given in para7.4 the sample as a whole shall be deemed not to comply with the crushing strength values.

8. DETERMINATION OF WATER ABSORPTION

8.1 Specimen- The specimens shall consist of whole bricks. Six specimens shall be tested for water absorption as detailed in 8.2.

8.2 Procedure - The test specimen shall be dried in a ventilated oven at 110°C-115°C for 48 hours or more until constant weight. The specimen shall be deemed to have reached the constant weight when after 2 hours drying in the same over the loss in weight does not exceed 0.1%. Each specimen shall immediately be weighed which shall be called the dry weight of the specimen. The dry specimen shall then be cooled in air at room temperature for about 2 hours after which they shall be immersed completely in clean soft water at ** 15°C for 24 hours. Each specimen shall then be removed from the water, the surface wiped off with a damp cloth and the specimen weighed. Weighing of any one specimen shall be completed within 3 minutes after removing the specimen from the water. This shall be called the wet weight.

* When the test on the mortar is cubes shows that the compressive strength of the mortar is not less than 280 kg^f/cm^2 and not exceeds 420 kg^f/cm^2. The failure shall be deemed to have occurred when no further increase in the load is registered with unchanged rate of moving head travel.

** Specimen noticeably warm to the touch shall not be immersed water.