BSEIDC

बिहार राज्य शैक्षणिक आधारभूत संरचना विकास निगम लिमिटेड
BIHAR STATE EDUCATIONAL INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

(A Govt. of Bihar Undertaking)
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कार्यालय आदेश

संख्या– 60 पटना, दिनांक: 06/05/2022

भारत का राजपत्र के रजिस्ट्री सं०– डी० एल० 33004/99 में प्रकाशित पर्यावरण, वन और जलवायु परिवर्त्तन मंत्रालय की अधिसूचना सं०–5075, दिनांक–31.012.2021 द्वारा भवन निर्माण सामग्री के विनिर्माण और संनिर्माण क्रियाकलाप में फ्लाई–ऐश (Fly Ash) के उपयोग को अनिवार्य करके उपजाऊ मिट्टी को संरक्षित करने की आवश्यकता हेतु निदेशित किया गया है। साथ ही, इसी क्रम में प्रधान सचिव, पर्यावरण एवं वन विभाग, बिहार–सह–अध्यक्ष, स्टेट लेभल मोनिटरिंग कमिटी फॉर फ्लाई–ऐश ब्रिक (Fly Ash Brick) की अध्यक्षता में आहूत दिनांक–19.04.2018 की बैठक में सरकारी योजनाओं में फ्लाई–ऐश (Fly Ash) ईंट का उपयोग सुनिश्चित करने का निर्णय लिया गया था।

तद्आलोक, उक्त निर्णय के आलोक में निदेश दिया जाता है कि बिहार राज्य शैक्षणिक आधारभूत संरचना विकास निगम (BSEIDC) के अंतर्गत कार्यान्वित निर्माण कार्य योजनाओं में भारतीय मानक ईंधन राख–चूने की ईंटे की विशिष्टियों (IS 12894:2002), पहला पुनरीक्षण में वर्णित General Requirements की कंडिका–3.1, Classification की कंडिका–4.1 (Class-1 हेतु आवश्यक न्यूनतम Compressive Strength 10 – 12N/mm^2), Dimension की कंडिका–5.1 एवं Tolerances की कंडिका 5.2 की विशिष्टियों का पालन करते हुए यथासंभव फ्लाई–ऐश (Fly Ash) ईंट का उपयोग किया जाय।

यह आदेश तत्काल प्रभाव से लागू होगा।

अनु०: यथोक्त्।

(ह०/–)
प्रबंध निदेशक
BSEIDC, पटना।

ज्ञापांक: BSEIDC/TECH/963/2022/- 3520 पटना, दिनांक: 06/05/2022

प्रतिलिपि: मुख्य अभियंता/अधीक्षण अभियंता/महाप्रबंधक (प्रशासन)/महाप्रबंधक (कार्य० एवं क्रिया०)/सभी कार्यपालक अभियंता (मुख्यालय) एवं क्षेत्रीय)/वरीय लेखा पदाधिकारी को सूचनार्थ एवं आवश्यक कार्यार्थ प्रेषित तथा परामर्शी (ICT), BSEIDC निगम वेबसाईट पर अपलोड करना सुनिश्चित करेंगे।

प्रबंध निदेशक
BSEIDC, पटना।

(53)

भारतीय मानक

ईंधन राख-चूने की ईंटें – विशिष्टि

(पहला पुनरीक्षण)

Indian Standard

PULVERIZED FUEL ASH-LIME BRICKS — SPECIFICATION

(First Revision)

ICS 691.421.2 : [666.924 + 662.613.13]

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

Price Group 2

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FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Building Lime and Lime Products Sectional Committee had been approved by the Civil Engineering Division Council.

This standard was first issued in 1990 covering modular size bricks of only four class designer that is 7.5, 10, 15 and 20.

Pulverized fuel ash commonly known as fly ash is a useful by-product from thermal power stations using pulverized coal as fuel and has considerable pozzolonic activity. This national resource has been gainfully utilized for manufacture of Pulverized fuel ash-lime bricks as a supplement to common burnt clay building bricks leading to conservation of natural resources and improvement in environmental quality.

Pulverized fuel ash-lime bricks are obtained from materials consisting of pulverized fuel ash in major quantity, lime and an accelerator acting as a catalyst. Pulverized fuel ash-lime bricks are generally manufactured by intergrinding or blending various raw materials which are then moulded into bricks and subjected to curing cycles at different emperatures and pressures. On occasion as and when required, crushed bottom fuel ash or sand is also used in he composition of the raw material. Crushed bottom fuel ash or sand is used in the composition as a coarser naterial to control water absorption in the final product. Pulverized fuel ash reacts with lime in presence of moisture o form a calcium-silicate hydrate which is a binder material. Thus pulverized fuel ash-lime brick is a chemically onded bricks.

'hese bricks are suitable for use in masonary construction just like common burnt clay bricks. Production of ulverized fuel ash-lime bricks has already started in the country and it is expected that this standard would encourage s production and use on mass scale. This standard lays down the essential requirements of pulverized fuel ash-me bricks so as to achieve uniformity in the manufacture of such bricks.

ırther technological advancement in this field advocated inclusion of more class designation like 3.5, 5, 12.5, '.5, 25 and 30 and non modular sizes. Various sizes, class designation and tolerances have been taken on the ısis of IS 13757 that is for Burnt clay fly ash building bricks.

ıe composition of the Committee responsible for formulation of this standard is given in Annex A.

r the purpose of deciding whether a particular requirement of this standard is complied with, the final value served or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the nded off value should be the same as that of the specified value in this standard.

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AMENDMENT NO. 1 JULY 2011
TO
IS 12894 : 2002 PULVERIZED FUEL ASH-LIME BRICKS — SPECIFICATION

(First Revision)

(*Page* 1, *clause* 2) — Delete the entry '3812 : 1981' along with its title.

(*Page* 1, *clause* 2) — Insert the following at the end:

'15648 : 2006 Pulverized fuel ash for lime pozzolana mixture applications — Specification'

(*Page* 2, *clause* **6.1**) — Substitute the following for the existing:

'6.1 Pulverized Fuel Ash

Pulverized fuel ash shall conform to IS 15648.'

(CED 4)

Reprography Unit, BIS, New Delhi, India

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Indian Standard

PULVERIZED FUEL ASH-LIME BRICKS — SPECIFICATION

(First Revision)

1 SCOPE

This standard lays down the requirements for classification, general quality, dimensions and physical requirements of pulverized fuel ash-lime bricks used in buildings.

NOTE — Pulverized fuel ash-lime bricks having wet compressive strength less than 30 N/mm^2 approximately 300 kgf/cm^2 are covered in this standard and for higher strength (*see* IS 2180 and IS 1077).

2 REFERENCES

The following Indian Standards contain provisions which, through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below :

IS No.	*Title*
712 : 1984	Specification for building limes (*third revision*)
1727 : 1967	Methods of test for pozzolanic materials (*first revision*)
3495	Methods of tests of burnt clay building bricks:
(Part 1) : 1992	Determination of compressive strength (*second revision*)
(Part 2) : 1992	Determination of water absorption (*second revision*)
(Part 3) : 1992	Determination of efflorescence (*second revision*)
3812 : 1981	Specification for fly ash for use as pozzolana and admixture (*first revision*)
4139 : 1989	Specification for calcium silicate bricks (*second revision*)
5454 : 1978	Methods for sampling of clay burnt building bricks (*first revision*)

3 GENERAL REQUIREMENTS

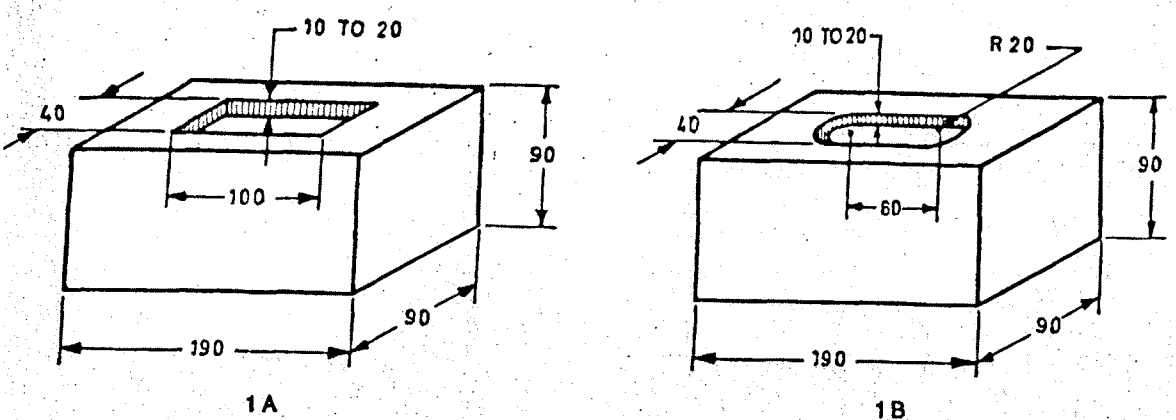
3.1 Visually the bricks shall be sound, compact and uniform in shape. The bricks shall be free from visible cracks, warpage and organic matters.

3.2 The bricks shall be solid and with or without frog 10 to 20 mm deep on one of its flat side. The shape and size of the frog shall conform to either Fig. 1A or Fig. 1B.

3.3 In case of non-modular size of bricks, frog dimensions shall be the same as for modular size bricks.

3.4 Hand-moulded bricks of 90 mm or 70 mm height shall be moulded with a frog 10 to 20 mm deep on one of its flat sides; the shape and size of the frog shall conform to either Fig. 1A or Fig. 1B (*see* **5.1.1** for *L*, *W* and *H*). Bricks of 40 or 30 mm height as well as those made by extrusion process may not be provided with frogs.

3.5 The bricks shall have smooth rectangular faces with sharp corners and shall be uniform in shape and colour.



All dimensions in millimetres.

FIG. 1 SHAPE AND SIZE OF FROGS IN BRICKS

CLASSIFICATION

4.1 Pulverized fuel ash-lime bricks shall be classified on the basis of average wet compressive strength as given in Table 1.

Table 1 Classes of Pulverized Fuel Ash-Lime Bricks

Class Designation	Average Wet Compressive Strength not Less Than	
	N/mm²	kgf/cm² (Approx)
(1)	(2)	(3)
30	30.0	(300)
25	25.0	(250)
20	20.0	(200)
17.5	17.5	(175)
15	15.0	(150)
12.5	12.5	(125)
10	10.0	(100)
7.5	7.5	(75)
5	5.0	(50)
3.5	3.5	(35)

5 DIMENSIONS AND TOLERANCES

5.1 Dimensions

5.1.1 The standard modular sizes of pulverized fuel ash-lime bricks shall be as follows (*see* Fig. 1A and 1B):

Length (L)	*Width (W)*	*Height (H)*
mm	mm	mm
190	90	90
190	90	40

5.1.2 The following non-modular sizes of the bricks may also be used (*see* Fig. 1A and Fig. 1B):

Length (L)	*Width (W)*	*Height (H)*
mm	mm	mm
230	110	70
230	110	30

5.1.2.1 For obtaining proper bond arrangement and modular dimensions for the brickwork, with the non-modular sizes, the following sizes of the bricks may also be used:

Length (L)	*Width (W)*	*Height (H)*
mm	mm	mm
70	110	70 1/3 length brick
230	50	70 ½ width brick

5.2 Tolerances

The dimensions of bricks when tested in accordance with **5.2.1** shall be within the following limits per 20 bricks:

a) *For Modular Size*

Length 3 720 to 3 880 mm (3 800 ± 80 mm)
Width 1 760 to 1 840 mm (1 800 ± 40 mm)
Height 1 760 to 1 840 mm (1 800 ± 40 mm)
(For 90 mm high bricks)
760 to 840 mm (800 ± 40 mm)
(For 40 mm high bricks)

b) *For Non-modular Size*

Length 4 520 to 4 680 mm (4 600 ± 80 mm)
Width 2 160 mm to 2 240 (2 200 ± 40 mm)
Height 1 360 mm to 1 440 (1 400 ± 40 mm)
(For 70 mm high bricks)
560 to 640 mm (600 ± 40 mm)
(For 30 mm high bricks)

5.2.1 Twenty (or more according to the size of stack) whole bricks shall be selected at random from the sample selected under **8**. All blisters, loose particles of clay and small projections shall be removed. They shall then be arranged upon a level surface successively as indicated in Fig. 2A, 2B and 2C in contact with each other and in a straight line. The overall length of the assembled bricks shall be measured with a steel tape or other suitable inextensible measure sufficiently long to measure the whole row at one stretch. Measurement by repeated application of short rule or measure shall not be permitted. If, for any reason it is found impracticable to measure bricks in one row, the sample may be divided into rows of 10 bricks each which shall be measured separately to the nearest millimetre. All these dimensions shall be added together.

NOTE — By the agreement between the purchaser and the manufacturer pulverized fuel ash-lime bricks may be manufactured in other sizes also. The tolerance requirements of length, width and height shall remain the same as given above.

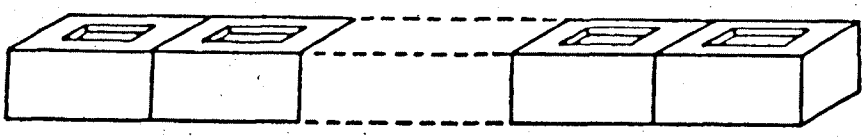
6 MATERIALS

6.1 Pulverized Fuel Ash (Commonly Known as Fly Ash)

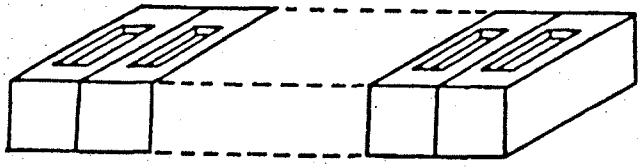
Pulverized fuel ash commonly known as fly ash shall conform to Grade 1 or Grade 2 of IS 3812.

6.2 Bottom Ash

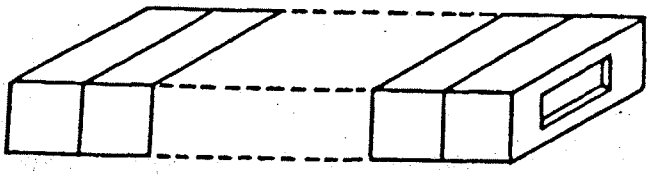
Bottom ash used as replacement of sand shall not have more than 12 percent loss on ignition when tested according to IS 1727.



2A Measurement of Length



2B Measurement of Width



2C Measurement of Height

FIG. 2 MEASUREMENT OF TOLERANCES OF COMMON BUILDING BRICKS

6.3 Sand

Deleterious materials, such as clay and silt in sand, shall preferably be less than 5 percent.

6.4 Lime

Lime shall conform to Class C hydrated lime of IS 712.

6.5 Additives

Any suitable additive considered not detrimental to the durability of the bricks such as gypsum, cement, etc, may be used.

PHYSICAL CHARACTERISTICS

7.1 Compressive Strength

The minimum average wet compressive strength of pulverized fuel ash-lime bricks shall not be less than the one specified for each class in **4.1** when tested as described in IS 3495 (Part 1). The wet compressive strength of any individual brick shall not fall below the minimum average wet compressive strength specified for the corresponding class of bricks by more than 20 percent.

NOTE — In case any of the test results of wet compressive strength exceed the upper limit for the class, the same shall be limited to the upper limit of the class for the purpose of averaging.

Drying Shrinkage

average drying shrinkage of the bricks when tested the method described in IS 4139, being the average of three units, shall not exceed 0.15 percent.

7.3 Efflorescence Test

The bricks when tested in accordance with the procedure laid down in IS 3495 (Part 3), shall have the rating of efflorescence not more than 'moderate' up to Class 12.5 and 'slight' for higher classes.

7.4 Water Absorption

The bricks, when tested in accordance with the procedure laid down in IS 3495 (Part 2), after immersion in cold water for 24 h, shall have average water absorption not more than 20 percent by mass up to class 12.5 and 15 percent by mass for higher classes.

8 SAMPLING AND CRITERIA FOR CONFORMITY

8.1 Sampling and criteria for conformity of the bricks shall be as given in IS 5454.

9 MARKING

9.1 Each brick shall be marked in a suitable manner with the manufacturer's identification mark or initials.

9.2 BIS Certification Marking

The bricks may also be marked with the Standard Mark.

9.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Building Limes and Lime Products Sectional Committee, CED 4

Organization	*Representative(s)*
Central Building Research Institute, Roorkee	DR C. L. VERMA *(Chairman)*
Ansal Properties and Industries Ltd, New Delhi	SHRI KARAN KUMAR MAHAJAN SHRI ASHOK DALWANI (*Alternate*)
Building Material and Technology Promotion Council, New Delhi	SHRI J. SENGUPTA SHRI V. K. SETHI (*Alternate*)
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Central Road Research Institute, New Delhi	SHRI SATENDER KUMAR
Central Soil and Materials Research Station, New Delhi	SHRI S. S. SURI SHRI MURARI RATNAM (*Alternate*)
Department of Mines and Geology, Government of Rajasthan, Udaipur	SHRI S. G. BOHRA SHRI G. L. VYAS (*Alternate*)
Dyerslime and Chemicals Pvt Ltd, Delhi	SHRI N. MACEDO
Fly Ash Mission, Department of Science and Technology, New Delhi	SHRI VIMAL KUMAR SHRI MUKESH MATHUR (*Alternate*)
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Lime Manufacturer Association of Doon Valley, Dehra Dun (Uttaranchal)	SHRI HARISH MARWAH
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National Council for Cement and Building Materials, Ballabhgarh (Haryana)	DR K. M. SHARMA DR M. M. ALI (*Alternate*)
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Office of the Development Commissioner (SSI), Ministry of Industry, New Delhi	SHRI A. S. SOOD SHRI K. JAICHANDRAN (*Alternate*)
Rajasthan Housing Board, Jaipur (Rajasthan)	SHRI S. C. SHARMA
Regional Engineering College, Warangal, Andhra Pradesh	PROF D. GANGADHARAN
Research, Designs and Standards Organization (Ministry of Railways), Lucknow(U. P.)	DEPUTY DIRECTOR STANDARDS (B&F) ASSISTANT DESIGN ENGINEER (B&F) (*Alternate*)
BIS Directorate General	SHRI S. K. JAIN, Director and Head (Civ Engg) [Representing Director General *(Ex-officio Member)*]

Member-Secretary
SHRI R. K. GUPTA
Joint Director (Civ Engg), BIS

Bureau of Indian Standards

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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