

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 10359 (1982): Code of practice for manufacture and use of lime-pozzolana concrete blocks for paving [CED 4: Building Limes and Gypsum Products]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



REAFFIRMED

2009

IS : 10359 – 1982
(Reaffirmed 2008)

Indian Standard

**CODE OF
PRACTICE FOR MANUFACTURE AND
USE OF LIME-POZZOLANA CONCRETE
BLOCKS FOR PAVING**

First Reprint APRIL 2009
(Including Amendments No. 1, 2 & 3)

UDC 666.953 : 666.974-431 : 625.82 : 006.76

© Copyright 1983

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

Indian Standard

CODE OF PRACTICE FOR MANUFACTURE AND USE OF LIME-POZZOLANA CONCRETE BLOCKS FOR PAVING

Building Limes Sectional Committee, BDC 4

Chairman

DR IQBAL ALI
A. P. Engineering Research Laboratories
Government of Andhra Pradesh, Hyderabad

Members

Representing

SHRI V. S. AGARWALA	Engineer-in-Chief's Branch, Ministry of Defence
MAJ S. P. SHARMA (<i>Alternate</i>)	
SHRI SURAJ S. J. BAHADUR	Housing and Urban Development Corporation, New Delhi
SHRI S. K. BANERJEE	National Test House, Calcutta
SHRI D. K. KANUGO (<i>Alternate</i>)	
DR S. K. CHOPRA	Cement Research Institute of India, New Delhi
SHRI K. C. NARANG (<i>Alternate</i>)	
DIRECTOR	Central Soil and Materials Research Station, New Delhi
DEPUTY DIRECTOR (<i>Alternate</i>)	
DIRECTOR, GERI, VADODARA	Public Works Department, Government of Gujarat, Ahmadabad
RESEARCH OFFICER (MATERIAL TESTING DIVISION) (<i>Alternate</i>)	
HOUSING COMMISSIONER	Rajasthan Housing Board, Jaipur
JOINT DIRECTOR RESEARCH (B & S), RDSO	Ministry of Railways
DEPUTY DIRECTOR RESEARCH (<i>Alternate</i>)	
SHRI H. L. MARWAH	Builder's Association of India, Bombay
SHRI HARISH C. KOHLI (<i>Alternate</i>)	
DR IRSHAD MASOOD	Central Building Research Institute (CSIR), Roorkee
SHRI S. P. GARG (<i>Alternate</i>)	
DR S. C. MAUDGAL	Deptt of Science and Technology, New Delhi
SHRI N. MACEDO	Dyer's Stone Co Pvt Ltd. Delhi
SHRI P. B. MOHAN RAO	Khadi and Village Industries Commission, Bombay
SHRI E. RAMACHANDRAN (<i>Alternate</i>)	

(Continued on page 2)

© Copyright 1983

BUREAU OF INDIAN STANDARDS

This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

IS : 10359 - 1982

(Continued from page 1)

<i>Members</i>	<i>Representing</i>
SHRI Y. R. PHULL	Central Road Research Institute (CSIR), New Delhi
SHRI M. L. BHATIA (<i>Alternate</i>)	
DR A. V. R. RAO	National Buildings Organization, New Delhi
SHRI J. SEN GUPTA (<i>Alternate</i>)	
REPRESENTATIVE	Lime Manufacturers Association of India, New Delhi
SHRI K. N. SRIVASTAVA	Department of Mines and Geology Government of Rajasthan, Udaipur
SHRI R. G. GUPTA (<i>Alternate</i>)	
SUPERINTENDING ENGINEER (W)	Public Works Department, Government of Madhya Pradesh, Bhopal
SHRI R. N. KHANNA (<i>Alternate</i>)	
SUPERINTENDING ENGINEER (PLG & DESIGN)	Public Works Department, Government of Tamil Nadu, Madras
EXECUTIVE ENGINEER (RESEARCH) (<i>Alternate</i>)	
SHRI G. RAMAN, Director (Civ Engg)	Director General, ISI (<i>Ex-officio Member</i>)

Secretary

SHRI S. SENGUPTA
Assistant Director (Civ Engg), ISI

AMENDMENT NO. 1 DECEMBER 1994
TO
IS 10359 : 1982 CODE OF PRACTICE FOR
MANUFACTURE AND USE OF LIME-POZZOLANA
CONCRETE BLOCKS FOR PAVING

(*First cover page, pages 1 and 3, title*) — Substitute the following for the existing title:

‘CODE OF PRACTICE FOR MANUFACTURE OF
LIME-POZZOLANA CONCRETE BLOCKS FOR
PAVING’

(*Page 4, clause 2.1*) — Substitute ‘IS 3115 : 1992*’ for ‘IS : 3115 - 1978*’ and ‘IS 6508 : 1988†’ for ‘IS : 6508 - 1972†’.

(*Page 4, clause 3.1*) — Substitute ‘IS 712 : 1984‡’ for ‘IS : 712 - 1973‡’.

(*Page 4, clause 3.3*) — Substitute ‘IS 1344 : 1981||’ for ‘IS : 1344 - 1968 ||’.

(*Page 4, clause 3.4*) — Substitute ‘IS 4098 : 1983¶’ for ‘IS : 4098 - 1982¶’.

(*Page 4, new clause*) — Insert the following new clause after 3.4 and renumber the subsequent clauses:

‘3.5 Cement — shall conform to IS 269 : 1989 |||| or IS 1489 (Part 1) : 1991 ¶¶ or IS 1489 (Part 2) : 1991 ¶¶.’

(*Page 4, foot-notes with ‘*’, ‘†’, ‘‡’, ‘||’, ‘¶’, ‘||||’ and ‘¶¶’ marks*) — Substitute the following for the existing foot-notes:

*Specification for lime based blocks (*second revision*).

†Glossary of terms relating to building lime (*first revision*).

‡Specification for building limes (*third revision*).

||Specification for calcined clay pozzolana (*second revision*).

¶Specification for lime-pozzolana mixture (*first revision*).

|||| Specification for 33 grade ordinary portland cement (*fourth revision*).

¶¶Specification for portland pozzolana cement:

Part 1 Fly ash based (*third revision*).

Part 2 Calcined clay based (*third revision*).

Amend No. 1 to IS 10359 : 1982

(Page 5, clause 6.1) — Insert the following sub-clause after 6.1:

'6.1.1 Sizes other than those mentioned in 6.1 may be manufactured with the agreement between the supplier and the purchaser.'

AMENDMENT NO. 2 DECEMBER 1999
TO
IS 10359 : 1982 CODE OF PRACTICE FOR
MANUFACTURE AND USE OF LIME-POZZOLANA
CONCRETE BLOCKS FOR PAVING

(*Page 4, clause 3.7 and also see Amendment No. 1*) — Substitute the following for the existing clause :

'3.7 Storage of Materials — Storage of the materials shall be in accordance with IS 4082 : 1996††'.

(*Page 4, footnote with '††' mark*) — Substitute the following for the existing:

‘††Recommendations on stacking and storage of construction materials and component at site (second revision).’

(CED 04)

AMENDMENT NO. 3 SEPTEMBER 2007
TO
IS 10359 : 1982 CODE OF PRACTICE FOR
MANUFACTURE OF LIME-POZZOLANA
CONCRETE BLOCKS FOR PAVING

(Page 4, clause 3.2) — Substitute the following for the existing clause:

‘3.2 Fly Ash – Shall conform to IS 3812 (Part 1) : 2003§.’

(Page 4, footnote marked §) — Substitute the following for the existing footnote:

‘§Pulverized fuel ash — Specification : Part 1 For use as pozzolana in cement, cement mortar and concrete *(second revision)*.’

AMENDMENT NO. 4 JULY 2011
TO
IS 10359 : 1982 CODE OF PRACTICE FOR MANUFACTURE AND USE OF
LIME-POZZOLANA
CONCRETE BLOCKS FOR PAVING

[Page 4, clause **3.2** (see also Amendment No. 3)] — Substitute the following for the existing:

‘3.2 Pulverized Fuel Ash — Shall conform to IS15648 : 2006§.’

(Page 4, clause **3.6**, line 5) — Substitute ‘IS 456 : 2000††’ for ‘IS 456 : 1978††’.

[Page 4, footnote marked § (see also Amendment No. 3)] — Substitute the following for the existing:

‘§Pulverized fuel ash for lime pozzolana mixture applications — Specification.’

(Page 4, footnote marked ††) — Substitute ‘(fourth revision)’ for ‘(third revision)’.

(Page 5, clause **5.1.1**, last line) — Substitutue ‘2005*’ for ‘1979*’.

(Page 5, footnote marked *) — Substitute ‘(third revision)’ for ‘(second revision)’.

(CED 4)

Indian Standard

CODE OF PRACTICE FOR MANUFACTURE AND USE OF LIME-POZZOLANA CONCRETE BLOCKS FOR PAVING

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 25 October 1982, after the draft finalized by the Limes Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Lime-pozzolana concrete blocks in addition to precast cement concrete blocks, stone tiles and burnt clay bricks can also be used in the construction of footpaths, pavements, passenger waiting sheds at bus stops and other places. These blocks are normally manufactured by using lime and pozzolana or lime-pozzolana mixture as binder. The Indian Standard specification laying down the dimensions and strength requirements for lime-pozzolana concrete blocks for paving has been covered separately. This code, which is an essential adjunct to the above specification, is intended to provide guidance with respect to the manufacture and use of such blocks.

0.3 In the preparation of this standard, considerable assistance has been rendered by the Central Road Research Institute, New Delhi.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This code covers the method of manufacture and curing of lime-pozzolana concrete blocks for use in paving.

*Rules for rounding off numerical values (*revised*).

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 3115-1978* and IS : 6508-1972† shall apply.

3. MATERIAL

3.1 **Lime** — Shall conform to class C (hydrated) of IS : 712-1973‡.

3.2 **Fly Ash** — Shall conform to grade I of IS : 3812-1981§.

3.3 **Burnt Clay Pozzolana** — Shall conform to IS : 1344-1968||.

3.4 **Lime-Pozzolana Mixture** — Shall conform to IS : 4098-1982¶.

3.5 **Coarse and Fine Aggregate** — Shall be either natural or crushed stone conforming to IS : 383-1970**.

3.6 **Water** — Water used for manufacture of blocks shall be clean and free from harmful amount of deleterious material. Potable water is generally considered satisfactory. For further requirements regarding limits of deleterious materials permitted, reference may be made to IS : 456-1978††.

3.7 **Storage of Materials** — Storage of the materials shall be in accordance with IS : 4082-1977‡‡.

4. MIX PROPORTIONS

4.1 The suggested proportions of lime-pozzolana concrete for making lime-pozzolana concrete blocks are given in Table 1.

5. MIXING

5.1 Mixing shall be done preferably in a mechanical concrete mixer.

5.1.1 Part of total water shall be added first and then coarse aggregate lime and pozzolana or lime-pozzolana mixture shall be fed in the drum of the mixer and the contents mixed. The remaining quantity of water shall then be finally added and the contents shall be mixed thoroughly. The total time of mixing shall be not less than 2 minutes and shall be

*Specification for lime based blocks (first revision).

†Glossary of terms relating to building lime.

‡Specification for building limes (second revision).

§Specification for fly ash for use as pozzolana and admixture (first revision).

||Specification for burnt clay pozzolana (first revision).

¶Specification for lime-pozzolana mixture (first revision).

**Coarse and fine aggregates from natural sources for concrete (second revision).

††Code of practice for plain and reinforced concrete (third revision).

‡‡Recommendations on stacking and storage of construction materials at site (first revision).

sufficient to ensure uniform mixing. Due allowance for water absorption by coarse and fine aggregate shall be given and the workability of the mix shall be adjusted depending upon the method of compaction adopted [(see 6.1.2 and 6.1.3 of IS : 2185 (Part I)-1979*].

6. MANUFACTURE

6.1 The lime-pozzolana concrete blocks for paving shall be of standard size $300 \times 300 \times 100$ mm. The total thickness of 100 mm shall consist of 90 mm thick lower layer of lime-pozzolana concrete, topped with 10 mm mm thick wearing coarse layer of cement and sand.

**TABLE 1 RECOMMENDED MIX PROPORTIONS FOR LIME
POZZOLANA CONCRETE BLOCKS**

(Clause 4.1)

SL No.	DESCRIPTION	MIX PROPORTION (BY MASS)					
		Lime Pozzo- lana Mixture	Lime	Pozzo- lana	Fine Aggre- gate	Coarse Aggre- gate of Size 20 mm Graded	Water Re- quirement by Mass of Total Material (Percent)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Using lime-pozzo- lana mixture of grade						
	LP 20	1	—	—	1	2	11
	LP 40	1	—	—	2	4	10
2	Using lime and pozzolana sepa- rately.						
	Lime reactivity (40 kgf/cm ²)	—	1	2	3	6	11
	Lime reactivity (80 kgf/cm ²)	—	1	2	6	12	10

NOTE — The above mix proportions are for information only and may be modified as required during manufacture to give the desired performance.

*Specification for masonry units : Part I Hollow and solid concrete blocks (second revision).

6.2 Lime-Pozzolana Concrete

6.2.1 The lime-pozzolana concrete layer shall be compacted in moulds (wooden or steel) either with pan tape surface vibrator or table vibrator or by hand tamping up to a height of 90 mm, out of the total height of 100 mm of the mould; when hand tamping is adopted, the compaction of lime-pozzolana shall be done in two layers.

6.3 Wearing Coarse

6.3.1 The wearing coarse layer of the remaining 10 mm height of the mould shall be provided with cement-sand mortar 1:3 (by mass), having water cement ratio of about 0.5 to 0.55 (by mass) and compacted either with pan type vibrator or table vibrator or by hand tamping.

6.3.2 In order to have a good bond between the top wearing coarse layer and the bottom lime pozzolana concrete layer, the wearing coarse layer shall be laid immediately after the compaction of lime-pozzolana concrete.

7. INITIAL CURING

7.1 Immediately after the block is prepared as per 6, it shall be released from the mould and removed along with the base plate to a covered shed. The shed shall be such as to provide protection against sun, strong wind and rain. The blocks shall be stored in the shed covered with polyethylene sheets until these are sufficiently hardened to permit handling without damage. But in no case shall the period be less than 72 hours.

8. FINAL CURING

8.1 The blocks after initial curing for 72 hours shall be stacked, suitably covered and shall be kept moist by spraying with water at regular intervals. The final curing period shall be not less than 28 days.

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones: 23230131, 23233375, 23239402 **Fax:** 91+011 23239399, 23233382

E - Mail : info@bis.org.in website : <http://www.bis.org.in>

Central Laboratory:

Plot No. 20/9, Site IV, Sahibabad Industrial Area, SAHIBABAD 201010

Telephone

277 0032

Regional Offices:

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002 2323 7617

*Eastern : 1/14 CIT Scheme VII M, V.I.P. Road, Kankurgachi, KOLKATA 700054 2337 8662

Northern: SCO 335-336, Sector 34-A, CHANDIGARH 160022 260 9285

Southern: C.I.T. Campus, IV Cross Road, CHENNAI 600113 2254 1984

†Western : Manakalaya, E9, MIDC, Behind Marol Telephone Exchange, Andheri (East), MUMBAI 400093 2832 9295

Branch Offices:

'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMEDABAD 380001 2560 1348

Peenya Industrial Area, 1st Stage, Bangalore-Tumkur Road, BANGALORE 2839 4955

Commercial-cum-Office Complex, Opp. Dushera Maidan, Arera Colony, Bittan Market, BHOPAL 462016 242 3452

62-63, Ganga Nagar, Unit VI, BHUBANESHWAR 751001 240 3139

5th Floor, Kovai Towers, 44 Bala Sundaram Road, COIMBATORE 641018 221 0141

SCO 21, Sector 12, Faridabad 121007 229 2175

Savitri Complex, 116 G.T. Road, GHAZIABAD 201001 286 1498

53/5 Ward No. 29, R.G. Barua Road, 5th By-lane, Apurba Sinha Path, GUWAHATI 781003 245 6508

5-8-56C, L.N. Gupta Marg, Nampally Station Road, HYDERABAD 500001 2320 1084

Prithavi Raj Road, Opposite Bharat Overseas Bank, C-Scheme, JAIPUR 302001 222 3282

11/418 B, Sarvodaya Nagar, KANPUR 208005 223 3012

Sethi Bhawan, 2nd Floor, Behind Leela Cinema, Naval Kishore Road, LUCKNOW 226001 261 8923

H. No. 15, Sector-3, PARWANOO, Distt. Solan (H.P.) 173220 235 436

Plot No A-20-21, Institutional Area, Sector 62, Goutam Budh Nagar, NOIDA 201307 240 2206

Patliputra Industrial Estate, PATNA 800013 226 2808

Plot Nos. 657-660, Market Yard, Gultkdi, PUNE 411037 2427 4804

"Sahajanand House" 3rd Floor, Bhaktinagar Circle, 80 Feet Road, RAJKOT 360002 237 8251

T.C. No. 2/275 (1 & 2), Near Food Corporation of India, Kesavadasapuram-Ulloor Road, Kesavadasapuram, THIRUVANANTHAPURAM 695004 255 7914

1st Floor, Udyog Bhavan, VUDA, Siripuram Junction, VISHAKHAPATNAM-03 271 2833

*Sales Office is at 5 Chowringhee Approach, P.O. Princep Street, KOLKATA 700072 2355 3243

†Sales Office (WRO) Plot No. E-9, MIDC, Rd No. 8, Behind Telephone Exchange, Andheri (East), Mumbai-400 0093 2832 9295