

**IS : 2116 - 1980**  
( Reaffirmed 1998 )

*Indian Standard*

**SPECIFICATION FOR  
SAND FOR MASONRY MORTARS**

*( First Revision )*

---

Fifth Reprint FEBRUARY 1999

UDC 691.223:691.53

© Copyright 1981

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

*Indian Standard*  
SPECIFICATION FOR  
SAND FOR MASONRY MORTARS  
( *First Revision* )

Building Construction Practices Sectional Committee, BDC 13

*Chairman*

SHRI C. P. MALIK

C-4/38, Safdarjung Development Area, New Delhi

*Members*

SHRI SURAJ S. J. BAHADUR

SHRI A. N. BAJAJ  
SHRI D. R. BATLIVALA  
SHRI J. R. BHALLA  
SHRI M. G. BHARGAVA

*Representing*

Housing & Urban Development Corporation Ltd,  
New Delhi  
Forest Research Institute & Colleges, Dehra Dun  
Bhabha Atomic Research Centre, Bombay  
Indian Institute of Architects, New Delhi  
Public Works Department, Government of Uttar  
Pradesh, Lucknow

SHRI R. K. MATHUR ( *Alternate* )  
CHIEF ENGINEER ( BLDGS ), PWD, Public Works Department, Government of Tamil  
MADRAS Nadu, Madras  
SUPERINTENDING ENGINEER,  
( SPECIAL BUILDING CIRCLE ),  
PWD, MADURAI ( *Alternate* )  
CHIEF ENGINEER-CUM-ADDL Public Works Department, Government of Raj-  
SECRETARY TO THE GOVERNMENT asthan, Jaipur  
( B&R )  
EXECUTIVE ENGINEER ( DESIGN  
& SPECIFICATION ) ( *Alternate* )  
CHIEF ENGINEER ( NDZ ) Central Public Works Department, New Delhi  
SUPERINTENDING SURVEYOR  
OF WORKS ( NDZ ) ( *Alternate* )  
DIRECTOR ( ARCHITECTURE ), Railway Board ( Ministry of Railways )  
RDSO, LUCKNOW  
JOINT DIRECTOR ( ARCHITEC-  
TURE ), RDSO, LUCKNOW ( *Alternate* )  
SHRI H. S. DUGAL Builders' Association of India, New Delhi  
BRIG HABISH CHANDRA ( *Alternate* )

( *Continued on page 2* )

© Copyright 1981

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.

(Continued from page 1)

<i>Members</i>	<i>Representing</i>
SHRI B. S. GREWAL	Public Works Department, Government of Punjab, Chandigarh
SHRI R. L. KUMAR	Institution of Surveyors, New Delhi
SHRI K. S. KHARB (Alternate)	
SHRI M. Z. KURIEN	Tata Consulting Engineers, Bombay
SHRI G. K. MAJUMDAR	Hindustan Prefab Ltd, New Delhi
SHRI H. S. PABRICHA (Alternate)	
SHRI R. C. MANGAL	Central Building Research Institute (CSIR), Roorkee
SHRI M. P. JAISINGH (Alternate)	
SHRI R. K. PANDARE	Life Insurance Corporation of India, Bombay
DY CHIEF ENGINEER (NORTH)	(Alternate)
SHRI G. M. RANADE	Public Works & Housing Department, Bombay
SHRI T. K. SARAN	Bureau of Public Enterprises (Ministry of Finance), New Delhi
SHRI S. S. KAIMAL (Alternate)	
SHRI R. D. SINGH	Engineer-in-Chief's Branch, Army Headquarters
SHRI M. G. VIRMANI (Alternate)	
SHRI S. R. SIVASWAMY	Gammon India Ltd, Bombay
SHRI H. D. MATANGE (Alternate)	
SHRI K. S. SRINIVASAN	National Buildings Organization, New Delhi
DY DIRECTOR (Alternate)	
SHRI SUSHIL KUMAR	National Buildings Construction Corporation Ltd, New Delhi
SHRI B. T. UNWALLA	Concrete Association of India, Bombay; and Insti- tution of Engineers (India), Calcutta
SHRI Y. K. MEHTA (Alternate)	Concrete Association of India, Bombay
SHRI JIVAN DUTT (Alternate)	Institution of Engineers (India), Calcutta
SHRI G. RAMAN, Director (Civ Engg)	Director General, ISI (Ex-officio Member)
	<i>Secretary</i>
	SHRI S. SENGUPTA Assistant Director (Civ Engg), ISI

### Masonry Construction Subcommittee, BDC 13 : 7

<i>Convener</i>	
SHRI R. K. GHOSH	Central Road Research Institute (CSIR), New Delhi
<i>Members</i>	
CHIEF ENGINEER	National Buildings Construction Corporation Ltd, New Delhi
SHRI DALJIT SINGH (Alternate)	
SHRI I. S. CHOPRA	Tirath Ram Ahuja Pvt Ltd, New Delhi
SHRI K. S. KHARB	Institution of Surveyors, New Delhi
SHRI JEET MALHOTRA	Indian Institute of Architects, Punjab, Chandi- garh

(Continued on page 8)

*Indian Standard*  
SPECIFICATION FOR  
SAND FOR MASONRY MORTARS  
( *First Revision* )

0. FOREWORD

**0.1** This Indian Standard ( First Revision ) was adopted by the Indian Standards Institution on 30 September 1980, after the draft finalized by the Building Construction Practices Sectional Committee had been approved by the Civil Engineering Division Council.

**0.2** This standard was first published in 1965. The revision has been prepared in the light of experience gained in the use of the standard during course of these years. A number of modifications in the provisions of the standard have been made, important among which is the particle size grading of sand for masonry work. The grading has been made more practicable by specifying only one limit of grading for both reinforced and unreinforced masonry work.

**0.2.1** The performance of masonry mortars is characterised by properties like strength, volume change, water retentivity, workability, etc. The role of sand in the mortar is to obtain these properties in the mortar to the best extent as would be possible with the amount of binder materials, such as cement, lime, etc, that are used in the mortar. It is not widely appreciated that sand for use in masonry mortar has got certain essential requirements to satisfy, namely, freedom from detrimental impurities and particle size distribution within specific limits of grading. Quite often sand is specified naming the localities from which it should be procured and probably it is the experience in many places that sands so available give satisfactory performance in normal construction work. While it would not be practicable often to change existing practice completely, there is room for improvement in the light of research and some of the basic requirements for sand to serve as an ingredient in masonry mortar can be specified, by choosing, if need be, better sources of supply and also by proper blending of sands from different sources. This standard specifies the basic requirements for sand for use in masonry mortars.

**0.3** In the formulation of this standard, due weightage has been given to co-ordination among the standards and practices prevailing in different

countries in addition to relating it to the practices in this field in the country.

**0.4** This standard contains clause 7 which requires the supplier to furnish some technical information at the request of the purchaser.

**0.5** 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 standard covers the requirements of naturally occurring sands, crushed stone sands and crushed gravel sands used in mortars for construction of masonry.

## 2. TERMINOLOGY

**2.0** For the purpose of this standard, the following definitions shall apply.

**2.1 Sand** — A fine aggregate which is either natural sand or crushed stone sand or crushed gravel sand.

**2.2 Natural Sand** — A fine aggregate produced by the natural disintegration of rock and which has been deposited by streams or glacial agencies.

**2.3 Crushed Stone Sand and Crushed Gravel Sand** — A fine aggregate produced by crushing stone or natural gravel.

## 3. QUALITY OF SAND

**3.1 General** — The sand shall consist of natural sand, crushed stone sand or crushed gravel sand or a combination of any of these. The sand shall be hard, durable, clean and free from adherent coatings and organic matter and shall not contain the amount of clay, silt and fine dust more than specified under 3.3 (a).

**3.2 Deleterious Material** — The sand shall not contain any harmful impurities such as iron pyrites, alkalis, salts, coal or other organic impurities, mica, shale or similar laminated materials, soft fragments, sea shells in such form or in such quantities as to affect adversely the hardening, strength or durability of the mortar.

**3.3 Limits of Deleterious Material** — Unless found satisfactory as a result of further tests as may be specified by the engineer-in-charge, or unless evidence of such performance is offered which is satisfactory to him,

---

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

the maximum quantities of clay, fine silt, fine dust and organic impurities in the sand shall not exceed the following limits:

- a) Clay, fine silt and fine dust when determined in accordance with IS : 2386 ( Part II )-1963\*.
- 1) In natural sand or crushed gravel sand Not more than 5 percent by mass
  - 2) In crushed stone sand Not more than 5 percent by mass
- b) Organic impurities when determined in accordance with IS : 2386 ( Part II )-1963\* Colour of the liquid shall be lighter than that indicated by the standard solution specified in IS : 2386 ( Part II )-1963\*

NOTE — In particular cases, crushed stone sand with even higher proportions of fine dust than specified above may be satisfactory and the limit so permitted may be subject to the agreement between the supplier and the purchaser.

#### 4. GRADING OF SAND

4.1 The particle size grading of sand for use in mortars shall be within the limits as specified in Table 1.

**TABLE 1 GRADING OF SAND FOR USE IN MASONRY MORTARS**

JS SIEVE DESIGNATION [ See IS : 460 ( PART I )- 1978* ]	PERCENTAGE PASSING BY MASS	REF TO METHOD OF TEST
(1)	(2)	(3)
4.75 mm	100	IS : 2386 ( Part I )-1963†
2.36 mm	90 to 100	
1.18 mm	70 to 100	
600 micron	40 to 100	
300 micron	5 to 70	
150 micron	0 to 15	

\*Specification for test sieves : Part I Wire cloth test sieves ( *second revision* ).

†Methods of test for aggregates for concrete : Part I Particle size and shape.

4.2 A sand whose grading falls outside the specified limits due to excess or deficiency of coarse or fine particles may be processed to comply with the standard by screening through a suitably sized sieve and/or blending with required quantities of suitable sizes of sand particles. Based on test results

\*Methods of test for aggregates for concrete : Part II Estimation of deleterious materials and organic impurities.

and in the light of practical experience with the use of local materials, deviation in grading of sand given in 4.1 may be considered by the engineer-in-charge.

**4.3** The various sizes of particles of which the sand is composed shall be uniformly distributed throughout the mass.

**4.4** The required grading may often be obtained by screening and/or by blending together either natural sands or crushed stone screenings, which are, by themselves unsuitable.

## **5. SAMPLING AND TESTING**

**5.1 Sampling** — The method of sampling shall be in accordance with IS : 2430-1969\*. The amount of material required for each test shall be as specified in relevant parts of IS : 2386-1963†.

**5.2 Testing** — Any test which the purchaser or his representative may require in connection with this standard shall be carried out in accordance with the relevant parts of IS : 2386-1963†. Unless otherwise stated in the enquiry or order, duplicate tests shall be made to all cases and the results of both tests reported.

**5.2.1** If further confirmation as to the satisfactory nature of the material is required, compressive test on cement mortar cubes ( 1 : 6 ) may be made in accordance with IS : 2250-1981‡ using the supplied material in place of standard sand and the strength value so obtained shall be compared with that of another mortar made with a sand of acceptable and comparable quality.

## **6. SUPPLIER'S CERTIFICATE AND COST OF TESTS**

**6.1** The supplier shall satisfy himself that the material supplied conforms to the requirements of this standard and, if requested, shall furnish a certificate to this effect to the purchaser or his representative.

**6.2** If the purchaser or his representative requires independent tests to be made, the sample for such tests shall be taken before or immediately after delivery, at the option of the purchaser or his representative, and the tests shall be carried out in accordance with this standard and on the written instructions of the purchaser or his representative.

**6.3** The supplier shall supply, free of charge, the material required for tests.

---

\*Methods for sampling of aggregates for concrete.

†Method of tests for aggregates for concrete.

‡Code of practice for preparation and use of masonry mortars ( *first revision* ).

**6.4** The cost of the tests carried out under **6.2** shall be borne as follows:

- a) By the supplier, if the results show that the material does not comply with the requirement of this standard; and
- b) By the purchaser, if the results show that the material complies with the requirement of this standard.

## **7. INFORMATION TO BE FURNISHED BY THE SUPPLIER**

**7.1** When requested by the purchaser or his representative, the supplier shall provide the following particulars:

- a) Source of supply, precise locality from where the materials were obtained, with the name of quarry or pit;
- b) Trade group of principal rock type used in the case of manufactured sand ( *see* Appendix C of IS : 383-1970\* ); and
- c) Particle size grading when determined in accordance with IS : 2386 ( Part I )-1963†.

**7.2** Subject to prior agreement, the supplier shall furnish the following additional information when required by the purchaser or his representative:

- a) Specific gravity of sand when determined in accordance with IS : 2386 ( Part III )-1963‡; and
- b) Bulk density when determined in accordance with IS : 2386 ( Part III )-1963‡.

---

\*Specification for coarse and fine aggregates from natural source for concrete (second revision ).

†Methods of test for aggregates for concrete : Part I Particle size and shape.

‡Methods of test for aggregates for concrete : Part III Specific gravity, density, voids, absorption and bulking.



( Continued from page 2 )

<i>Members</i>	<i>Representing</i>
SHRI Y. K. MEHTA	Concrete Association of India, Bombay
SHRI V. D. LONDHE ( <i>Alternate</i> )	
DR S. S. REHSI	Central Building Research Institute ( CSIR ), Roorkee
SHRI B. K. JINDAL ( <i>Alternate</i> )	
SENIOR CIVIL ENGINEER ( DESIGNS/ SPL ), NORTHERN RAILWAY	Railway Board ( Ministry of Railways )
SHRI K. S. SRINIVASAN	National Buildings Organization, New Delhi
ASSISTANT DIRECTOR ( <i>Alternate</i> )	
SUPERINTENDING ENGINEER ( PLANNING & DESIGNS )	Public Works Department, Government of Tamil Nadu, Madras
EXECUTIVE ENGINEER ( BUIL- DING CENTRE ) ( <i>Alternate</i> )	
SUPERINTENDING ENGINEER AND DY SECRETARY (B)	Public Works & Housing Department, Govern- ment of Maharashtra, Bombay
SUPERINTENDING SURVEYOR OF WORKS ( FOOD )	Central Public Works Department, New Delhi
SURVEYORS OF WORKS ( FOOD ) ( <i>Alternate</i> )	
SHRI K. M. TANDON	Engineer-in-Chief's Branch, Army Headquarters
SHRI B. S. GOPALAN ( <i>Alternate</i> )	

## BUREAU OF INDIAN STANDARDS

### Headquarters:

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

Telephones: 323 0131, 323 3375, 323 9402

Fax : 91 11 3234062, 91 11 3239399, 91 11 3239382

Telegrams : Manaksanstha  
(Common to all Offices)

### Central Laboratory:

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

Telephone  
8-77 00 32

### Regional Offices:

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002 323 76 17  
\*Eastern : 1/14 CIT Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054 337 86 62  
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022 60 38 43  
Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113 235 23 15  
†Western : Manakalaya, E9 Behind Marol Telephone Exchange, Andheri (East),  
MUMBAI 400093 832 92 95

### Branch Offices:

'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMEDABAD 380001 550 13 48  
‡Peenya Industrial Area, 1st Stage, Bangalore - Tumkur Road,  
BANGALORE 560058 839 49 55  
Gangotri Complex, 5th Floor, Bhadbhada Road, T. T. Nagar, BHOPAL 462003 55 40 21  
Plot No. 62-63, Unit VI, Ganga Nagar, BHUBANESHWAR 751001 40 36 27  
Kalaikathir Buildings, 670 Avinashi Road, COIMBATORE 641037 21 01 41  
Plot No. 43, Sector 16 A, Mathura Road, FARIDABAD 121001 8-28 88 01  
Savitri Complex, 116 G. T. Road, GHAZIABAD 201001 8-71 19 96  
53/5 Ward No. 29, R. G. Barua Road, 5th By-lane, GUWAHATI 781003 54 11 37  
5-8-58C, L. N. Gupta Marg, Nampally Station Road, HYDERABAD 500001 20 10 83  
E-52, Chitaranjan Marg, C-Scheme, JAIPUR 302001 37 29 25  
117/418 B, Sarvodaya Nagar, KANPUR 208005 21 68 76  
Seth Bhawan, 2nd Floor, Behind Leela Cinema, Naval Kishore Road,  
LUCKNOW 226001 23 89 23  
Patliputra Industrial Estate, PATNA 800013 26 23 05  
T. C. No. 14/1421, University P. O. Palayam,  
THIRUVANANTHAPURAM 695034 6 21 17  
NIT Building, Second Floor, Gokulpāt Market, NAGPUR 440010 52 51 71  
Institution of Engineers ( India ) Building, 1332 Shivaji Nagar, PUNE 411005 32 36 35

\*Sales Office is at 5 Chowringhee Approach, P. O. Princep Street,  
CALCUTTA 700072 27 10 85

†Sales Office is at Novelty Chambers, Grant Road, MUMBAI 400007 309 65 28

‡Sales Office is at 'F' Block, Unity Building, Narashimaraja Square,  
BANGALORE 560002 222 39 71