IS 4832-1 (1969): chemical resistant mortars, Part I: Silicate type [CED 5: Flooring, Wall Finishing and Roofing]

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(Reaffirmed 2001)

Indian Standard

SPECIFICATION FOR CHEMICAL RESISTANT MORTARS

PART I SILICATE TYPE

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

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January 1970

Indian Standard

SPECIFICATION FOR CHEMICAL RESISTANT MORTARS

PART I SILICATE TYPE

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Indian Standard

SPECIFICATION FOR CHEMICAL RESISTANT MORTARS

PART I SILICATE TYPE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 25 November 1969, after the draft finalized by the Flooring and Plastering Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 The chemically setting silicate type mortars are resistant to most acids except hydro-fluoric and concentrated ortho-phosphoric acids. They are not resistant to alkalies of any concentration, or to boiling water and steam and are likely to be deteriorated by continued exposure with water or frequent washing with water. The silicate type of mortar is found to be satisfactory to resist nitric, chromic, sulphuric and hydrochloric acids and are used for jointing acid-proof bricks or tiles in construction of towers, stacks, tank-lining, sumps, drains, chemical resistant floors, etc. The potassium silicate type mortar is recommended where resistance to sulphuric acid or mixtures of sulphuric and other acids is required. For actual method of use of silicate type mortars, IS : 4441-1967* shall be referred.

0.3 In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country. This has been met by deriving assistance from C466-1962T ' Tentative specifications for chemically setting silicate and silica types of chemical resistant mortars ' issued by the American Society for Testing and Materials.

0.4 Investigations carried out by the Central Building Research Institute, Roorkee, has also been of assistance.

0.5 This standard contains clause **5.1** which calls for agreement between the purchaser and the supplier with regard to the limits of chemical resistance.

*Code of practice for use of silicate type chemical resistant mortars.

0.6 This standard is one of a series of Indian Standards on chemical resistant mortars. Other standards published so far in the series are:

IS : 4441-1967 Code of practice for use of silicate type chemical resistant mortars

IS : 4442-1967 Code of practice for use of sulphur type chemical resistant mortars

IS : 4443-1967 Code of practice for use of resin type chemical resistant mortars

IS : 4456 (Part I)-1967 Methods of test for chemical resistant mortars: Part I Silicate type and resin type

IS : 4456 (Part II)-1967 Methods of test for chemical resistant mortars: Part II Sulphur type

IS : 4832 (Part III)-1968 Specification for chemical resistant mortars: Part III Sulphur type

0.7 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 for chemically setting silicate type of chemical resistant mortars for bonding chemical-resistant masonry units.

2. TERMINOLOGY

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

2.1 Chemically Setting Silicate Type Chemical-Resistant Mortar — An intimate mixture of a chemically inert solid filler, a setting agent usually contained in the filler and a liquid silicate binder. When the filler and the binder are mixed at ordinary temperatures, a trowelable mortar is formed which subsequently hardens by the chemical reaction between the setting agent and the liquid silicate binder.

3. MATERIALS

3.1 Binders — The liquid binder may be a solution of sodium silicate with soda-silica molecular ratio of 2·5 to 3·5 and/or potassium silicate

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

with potassium oxide-silica molecular ratio of 1·8 to 2·3. The solution shall have a specific gravity of about 1·3 and shall be capable of forming chemical resistant mortar when mixed with a suitable setting agent and filler material.

3.2 Fillers — The fillers may be silica, quartz, ganister, andesite or other material insoluble in common mineral acids, except hydro-fluoric acid.

3.3 Setting Agent — The setting agent generally used is a fluoride or acid compound which shall react with the silicate binder to form an insoluble silica gel.

4. PHYSICAL REQUIREMENTS

4.1 Chemically setting silicate type chemical resistant mortars shall satisfy the requirements given in Table 1 when tested in accordance with IS : 4456 (Part I)-1967*.

TABLE 1 PHYSICAL REQUIREMENTS OF SILICATE TYPE CHEMICAL RESISTANT MORTARS

(*Clauses* 4.1, A-3.1 *and* A-3.3)

Sl No.	Property	Requirement, Type of Mortar		Method of Test, Ref to Cl No. of IS : 4456 (Part I)-1967*
		Sodium Silicate	Potassium Silicate	
(1)	(2)	(3)		(4)
1.	Working time, *Min*, at 27 ± 2°C (*minutes*)	15	20	3
2.	Flexural strength, *Min*, kg/cm² (at 7 days)	35	40	6
3.	Compressive strength, *Min*, kg/cm² (at 7 days)	100	150	7
4.	Bond strength, *Min*, kg/cm²	5	5	8
5.	Absorption of toluene, *Max*, percent by weight	18	18	9

*Methods of test for chemical resistant mortars : Part I Silicate type and resin type.

5. CHEMICAL RESISTANCE REQUIREMENT

5.1 The limits of chemical resistance may be mutually agreed to between the purchaser and the supplier when tested in accordance with IS : 4456 (Part I)-1967*.

*Methods of test for chemical resistant mortars: Part I Silicate type and resin type.

6. SAMPLING

6.1 The method of drawing representative samples of the material and the criteria for conformity shall be as given in Appendix A.

7. PACKING AND MARKING

7.1 The silicate solution shall be packed in suitable sealed airtight containers. The dry mix shall be properly packaged to prevent deterioration in storage. The following information shall be marked legibly on each package:

a) Name of manufacturer,
b) Date of manufacture/batch No.,
c) Net volume/weight in case of solution,
d) Net weight in case of dry mix,
e) Storage requirements,
f) Storage life, and
g) Date of expiry.

7.1.1 Each package may also be marked with the Standard Mark.

NOTE — 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 Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

APPENDIX A

(*Clause* 6.1)

SAMPLING PROCEDURE FOR ACCEPTANCE TEST

A-1. LOT

A-1.1 The quantity of binder and filler from the same manufacturing unit offered for inspection in one lot shall be such as to give not less than 1 000 kg of the mortar when mixed well by suitable means.

A-1.2 Samples shall be selected and tested from each lot separately for ascertaining its conformity to the requirements of the specification.

A-2. SELECTION

A-2.1 Since the mortar is obtained by intimately mixing the filler and the binder which are packed separately, as a first step suitable number of containers of the filler and binder shall be selected from the lot. The number of containers shall not be less than 10 percent of the total number of containers in the lot. Equal quantities of material shall be taken from each container selected and the filler and the binder shall be mixed well to give the sample of mortar for the lot.

A-3. CRITERIA FOR CONFORMITY

A-3.1 Specimens shall be taken from the mortar sample and tested for all the requirements given in Table 1 of this standard.

A-3.2 A lot shall be considered as having satisfied the requirements of this specification if the results for all the tests satisfy the relevant requirements of this specification.

A-3.3 Re-test — If the sample, when tested, do not comply with the requirements specified in Table 1, another set of sample shall be prepared from the same lot and subjected to the tests. If the second sample also fails to comply with the requirements of Table 1 then the lot represented by the samples shall be rejected.

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones : 331 01 31, 331 13 75 Telegrams : Manaksanstha
(Common to all offices)

Regional Offices :	*Telephone*
*Western : Manakalaya, E9 MIDC, Marol, Andheri (East), BOMBAY 400093	6 32 92 95
†Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola, CALCUTTA 700054	36 24 99
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*Sales Office in Bombay is at Novelty Chambers, Grant Road, Bombay 400007 — 89 65 28

†Sales Office in Calcutta is at 5 Chowringhee Approach, P.O. Princep Street, Calcutta 700072 — 27 68 00

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TO

IS : 4832 (Part I)-1969 SPECIFICATION FOR CHEMICAL RESISTANT MORTARS

PART I SILICATE TYPE

Alteration

(*Pages* 4 *and* 5, *clause* **3.1**) — Substitute the following for the existing clause:

'**3.1 Binders** — The liquid binder may be a solution of sodium silicate or potassium silicate with silica/sodium oxide or silica/potassium oxide molecular ratio of 3 to 3·7. The solution may have a specific gravity of 1·4 and shall be capable of forming chemical resistant mortar when mixed with a powder consisting of suitable setting agent and filler material.'

Addenda

(*Page* 5, *clause* **5.1**) — Add the following new matter at the end of the clause:

'A general guide for chemical resistance of silicate type mortars to various substances is given at Table 1 of IS : 4441-1980†.'

(*Page* 5, *foot-note with* '*' *mark*) — Add the following new foot-note after '*' mark:

'†Code of practice for use of silicate type chemical resistant mortars (*first revision*).'

(BDC 5)

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