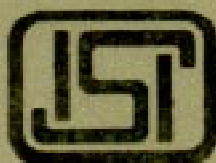


*Indian Standard*  
SPECIFICATION FOR  
SOIL BASED BLOCKS USED IN  
GENERAL BUILDING CONSTRUCTION  
( *First Revision* )

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

*Indian Standard*

SPECIFICATION FOR  
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Soil Engineering and Rock Mechanics Sectional Committee, BDC 23

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*Indian Standard*  
SPECIFICATION FOR  
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( *First Revision* )

0. FOREWORD

**0.1** This Indian Standard ( First Revision ) was adopted by the Indian Standards Institution on 14 April 1982, after the draft finalized by the Soil Engineering and Rock Mechanics Sectional Committee had been approved by the Civil Engineering Division Council.

**0.2** Development during the last two decades in the use of soil based blocks in different parts of the world and the experience which has been gained for nearly a decade in the field of construction in India hold out a great promise for the use of soil based blocks in general building construction, particularly in low-cost structures. Experience shows that most soils can be satisfactorily stabilized with cement-lime. It is, however, necessary to conduct comprehensive tests on soils in a laboratory in order to determine the optimum requirements to give the specified properties. While in general building construction soil based blocks may be used as a substitute for bricks, their use should be avoided in the case of isolated load bearing columns, piers and such other heavily loaded structures.

**0.2.1** This standard was first published in 1960. Based on further studies conducted, this revision has been prepared. The principal modification is in respect of weathering test, which has been prescribed as per studies conducted at Indian Institute of Science, Bangalore. The revision now covers all types of soil based blocks.

**0.3** 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.

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

**1. SCOPE**

**1.1** This standard covers the requirements and test for soil based blocks for use in general building construction.

**2. GENERAL**

**2.1** Soil based blocks shall be manufactured from a mixture of suitable soil and ordinarily portland cement or lime pozzolana mixture thoroughly mixed together, preferably in a mechanical mixer. The mixture is moulded and cast into blocks.

**3. CLASSIFICATION**

**3.1** The blocks shall be of two classes, Class 20 and Class 35 (*see 5.1*).

**4. SIZES**

**4.1** There shall be three sizes of soil-cement blocks, the dimensions of which shall be as follows:

<i>Length</i>	<i>Breadth</i>	<i>Height</i>
cm	cm	cm
19	9	9
19	9	4
29	19	9

**4.2** The dimensions shall be tested in accordance with the procedure given in **4.2.1** and shall be within following limits per twenty blocks.

<i>Block Size</i>	<i>Length</i>	<i>Breadth</i>	<i>Height</i>
cm	cm	cm	cm
19 × 9 × 9	372 to 388	174 to 186	174 to 186
19 × 9 × 4	372 to 388	174 to 186	74 to 86
29 × 19 × 9	570 to 590	372 to 388	174 to 186

**4.2.1** Twenty ( more according to the size of stack ) whole blocks shall be selected at random from the sample selected under **6**. All blisters, loose particles of clay and small projections shall be removed. They shall then be arranged upon a level surface successively in contact with each other and in a straight line. The overall length of the assembled blocks shall be measured with a steel tape or other suitable inextensible measures 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 blocks in one row, the

sample may be divided into rows of 10 blocks each, which shall be measured separately to the nearest millimetre. All these dimensions shall be added together.

4.3 Each block shall also have a frog one centimetre deep and  $10 \times 4$  cm on one of its flat sides.

## 5. PHYSICAL REQUIREMENTS

5.1 **Compressive Strength** — The blocks when tested in accordance with the procedure laid down in IS: 3495 ( Part I )-1976\* shall have a minimum average compressive strength of not less than  $20 \text{ kgf/cm}^2$  for Class 20 and  $30 \text{ kgf/cm}^2$  for Class 30.

5.1.1 The compressive strength of any individual block shall not fall below the minimum average compressive strength by more than 20 percent.

5.2 **Water Absorption** — The block when tested in accordance with the procedure laid down in IS: 3495 ( Part II )-1976†, after immersion in cold water for 24 hours, an average water absorption shall not be more than 15 percent by weight.

5.3 **Weathering** — When tested in accordance with Appendix A, the maximum loss of weight shall not exceed 5 percent.

## 6. SAMPLING AND CRITERIA FOR CONFORMITY

6.1 Sampling and criteria for conformity of the blocks shall be done in accordance with the procedure laid down in IS: 5454-1978‡.

## 7. MARKING

7.1 Each block shall be marked in the frog with the manufacturer's identification mark or initials.

7.1.1 The manufacturers may also use the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI 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 ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

\*Methods of test for burnt clay building bricks: Part I Determination and compressive strength ( *second revision* ).

†Methods of test for burnt clay building bricks: Part II Determination of water absorption ( *second revision* ).

‡Methods for sampling of clay building bricks ( *first revision* ).

## APPENDIX A

( Clause 5.3 )

### WEATHERING TEST

**A-1. PRINCIPLE** The parameters that need be simulated in the weathering test are the ( i ) rain drop diameter at impact ( range in 2 mm for medium intensity and 4 mm for high intensity ) ( ii ) maximum terminal velocity of 6.5 m/sec at impact, and ( iii ) maximum intensity of rainfall, 15-30 mm/hr.

### A-2. TEST SPECIMENS

**A-2.1** Three whole blocks shall be selected from the sample of blocks produced after carrying out the test for dimensional conformity. These blocks shall be designated as specimen A, B and C respectively.

### A-3. SPRAY TEST

**A-3.1** A set of spray non-rustable showers that can produce a hard spray all over the block should be used. The diameter of each shower is 10 cm with 36 holes of 2 mm diameter. A facility for providing a device pump to create a constant pressure of  $1.5 \pm 0.2 \text{ kgf/cm}^2$  should be available for this test.

### A-4. PROCEDURE

**A-4.1** The block to be tested is to be mounted on a test rig, such that only one face is exposed to shower and discharged water should find an exit without wetting the other faces or getting collected such that blocks get immersed. These showers are placed at a distance of 18 cm from the block and are arranged by the side, such that the complete face gets exposed. The period of exposure is limited to 2 hours and then the exposed surfaces are examined for possible pitting. The tests are carried out on at least 3 blocks. The limiting diameter of the pit formed is to be within 1 cm for passing this weathering test.

( Continued from page 2 )

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## INTERNATIONAL SYSTEM OF UNITS ( SI UNITS )

### Base Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

### Supplementary Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Plane angle	radian	rad
Solid angle	steradian	sr

### Derived Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>	<i>Definition</i>
Force	newton	N	1 N=1kg. m/s <sup>2</sup>
Energy	joule	J	1 J=1 N.m
Power	watt	W	1 W=1 J/s
Flux	weber	Wb	1 Wb=1 V.s
Flux density	tesla	T	1 T=1 Wb/m <sup>2</sup>
Frequency	hertz	Hz	1 Hz=1 c/s (s <sup>-1</sup> )
Electric conductance	siemens	S	1 S=1 A/V
Electromotive force	volt	V	1 V=1 W/A
Pressure, stress	pascal	Pa	1 Pa=1 N/m <sup>2</sup>

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