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IS 9498 (1980): inorganic aggregates for use in gypsum plaster [CED 4: Building Limes and Gypsum Products]



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Indian Standard

SPECIFICATION FOR
INORGANIC AGGREGATES FOR
USE IN GYPSUM PLASTER

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SPECIFICATION FOR INORGANIC AGGREGATES FOR USE IN GYPSUM PLASTER

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Indian Standard

SPECIFICATION FOR INORGANIC AGGREGATES FOR USE IN GYPSUM PLASTER

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 21 April 1980, after the draft finalized by the Gypsum Building Materials Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Inorganic aggregates are commonly used in the manufacture of gypsum plaster. Most commonly used aggregates are perlite, sand and vermiculite. This standard lays down minimum requirements of inorganic aggregates for use in manufacture of gypsum plaster.

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.

1. SCOPE

1.1 This standard covers requirements of the inorganic aggregates most commonly used in gypsum plaster, which include perlite, sand (natural and manufactured), and vermiculite.

NOTE—Other aggregates may be used, provided tests have demonstrated that they yield plaster of satisfactory quality.

2. TERMINOLOGY

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

2.1 Perlite Aggregate—A siliceous volcanic glass properly expanded by heat.

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

2.2 Sand Aggregate

2.2.1 Natural Sand — The fine granular material resulting from the natural disintegration of rock or from the crushing of friable sandstone or quartzite.

2.2.2 Manufactured Sand — The fine material resulting from the crushing and classification by screening, or otherwise, of rock, gravel or blast furnace slag.

2.3 Vermiculite Aggregate — A micaceous mineral properly expanded by heat.

3. GRADING

3.1 Sieve Analysis — The aggregate, except as provided in 3.2, shall be graded within the limits specified in Table 1.

TABLE 1 GRADING REQUIREMENTS

SIEVE SIZE	PERCENTAGE RETAINED ON EACH SIEVE, CUMULATIVE					
	Perlite by Volume		Vermiculite by Volume		Sand by mass	
	Max	Min	Max	Min	Max	Min
IS Sieve						
4.75 mm	0	—	0	—	0	—
2.36 mm	5	0	10	0	5	0
1.18 mm	60	5	75	40	30	5
600 micron	95	45	95	65	65	30
300 micron	98	75	98	75	95	65
150 micron	100	85	100	90	100	90

3.2 For natural or manufactured sand, not more than 50 percent shall be retained between any two consecutive sieves shown in 3.1 nor more than 25 percent between 300 micron IS Sieve and 150 micron IS sieve.

3.3 For natural or manufactured sand, the amount of material finer than 75 micron IS sieve shall not exceed 5 percent.

4. MASS

4.1 The mass of perlite aggregate shall be not less than 100 kg/m³ nor more than 200 kg/m³.

4.2 The mass of vermiculite aggregate shall be not less than 100 kg/m³ nor more than 160 kg/m³.

5. IMPURITIES

5.1 Water soluble impurities in sand shall not exceed 0.15 percent by mass and sodium ion content shall not exceed 0.02 percent by mass.

5.2 Sand, when subjected to the colourimetric test for organic impurities shall develop a colour not darker than the standard [see IS : 2386 (Part II)-1963*] unless it is established by adequate tests that the impurities causing the colour are not harmful in plaster.

6. SAMPLING

6.1 Samples of natural or manufactured sand shall be obtained in accordance with IS : 2430-1969†.

6.2 For bagged aggregates, at least one bag shall be taken at random for sampling from each 100 bags, but not less than 6 bags from each shipment of 100 bags or more, and for smaller shipments not less than 6 percent of the bags, shall be sampled. Representative portions from each bag selected shall be secured by means of a suitable sampling tube. The sampling tube shall be inserted the full distance between diagonally opposite corners of the bag with the bag lying in a horizontal position. The portion so obtained shall be combined to produce a gross sample having a volume of at least 28 dm³. At least one composite sample shall be prepared and tested separately for each 2 000 bags of aggregate used.

6.3 Samples secured in accordance with **6.1** or **6.2** shall be reduced by quartering or riffing to obtain samples of proper size for individual tests.

7. METHODS OF TEST

7.1 Sieve Analysis — Sieve analysis shall be done as per procedure given in IS : 2386 (Part I)-1963‡, subject to the following modification :

The sample shall consist of approximately 500 ml bulk volume. Where a mechanical sieving device is used, the sieving time shall be

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

†Methods for sampling of aggregates for concrete.

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

5 minutes. The volume of each sieve fraction shall be measured in a 250 ml graduated cylinder. The aggregate shall be poured loosely into the graduated cylinder without tamping or shaking, the surface levelled with a spatula, and the volume read within ± 2 ml. The volume of the individual sieve fractions shall be expressed as percentages of the sum of the volumes of all fractions. The percentage retained on each designated sieve shall be calculated by summing the individual percentages of all fractions larger than that sieve.

7.2 Mass — The mass of lightweight aggregate shall be determined as per procedure given in IS : 2386 (Part III)-1963*.

7.3 Organic Impurities — The organic impurities shall be determined as per procedure given in IS : 2386 (Part II)-1963†.

7.4 Water-Soluble Impurities — Weigh accurately a 10 g sample of sand. Transfer to a 250-ml beaker. Add 100 ml of distilled water. Heat to boiling and allow to a simmer on a hot plate for 5 minutes. Filter through a fine paper into a tared evaporating dish. Wash with hot distilled water until the volume of filtrate is about 125 ml. Evaporate to dryness. The temperature of the dish shall not exceed 120°C during final drying. Cool in a desiccator, weigh, and calculate the mass of residue to percentage of water-soluble impurities.

8. PACKING AND MARKING

8.1 When lightweight inorganic aggregates are delivered in packages, the name of the manufacturer, type of aggregate, minimum mass and approximate volume of the contents shall be legibly indicated thereon.

9. REJECTION

9.1 The purchaser of materials covered by this specification shall have the option of evaluating these materials for rejection, by either minimum mass or approximate volume as stated.

9.2 Individual packages may be rejected when:

- a) The contents, on a mass basis, are 5 percent less than that indicated on the packages; or
- b) The contents, on a volume basis, are 10 percent less than that indicated on the packages.

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

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

9.3 The entire shipment may be rejected on a mass basis when the average contents of two packages for each 100 but not less than six packages selected at random, in any one shipment, are less than that indicated on the package and/or on a volume basis when the average contents of two packages for each 100 but not less than six packages selected at random, in any one shipment, differ by more than 5 percent more or 10 percent less from that indicated on the package.

9.4 The net mass of the contents shall be determined by weighing the package or packages and deducting the mass of the container.

9.5 The volume of the contents in the package shall be calculated by determining the mass of the contents of the package and then obtaining the mass per cubic metre of the aggregate, from an average mass package of the samples selected on volume basis as in **9.3** and then dividing the mass of the contents of the bag by the mass per cubic metre of aggregate.

INDIAN STANDARDS
ON
GYPSUM

IS:

- 2095-1964 Gypsum plaster boards
- 2469-1976 Glossary of terms relating to gypsum (*first revision*)
- 2542 (Part I/Sec 1 to 12)-1978 Methods of test for gypsum plaster, concrete and products; Part I Plaster and concrete (*first revision*)
- 2542 (Part II)-1964 Methods of test for gypsum plaster, concrete and products: Part II Gypsum products
- 2547 (Part I)-1976 Gypsum building plaster: Part I Excluding premixed lightweight plasters (*first revision*)
- 2547 (Part II)-1976 Gypsum building plaster: Part II Premixed lightweight plasters (*first revision*)
- 2849-1964 Non-load bearing gypsum partition blocks (solid and hollow types)
- 8272-1976 Gypsum plaster for use in the manufacture of fibrous plaster boards
- 8273-1976 Fibrous gypsum plaster boards