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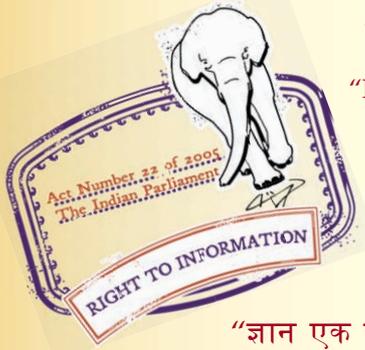
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IS 12679 (1989): By-product gypsum for use in plaster, blocks and boards [CED 4: Building Limes and Gypsum Products]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

**BY-PRODUCT GYPSUM FOR USE IN
PLASTER, BLOCKS AND BOARDS —
SPECIFICATION**

भारतीय मानक

प्लास्टर, ब्लाक और बोर्डों में प्रयुक्त जिप्सम उप-उत्पाद — विशिष्ट

UDC 666'91

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FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards on 11 May 1989, after the draft finalized by the Gypsum and Gypsum Based Products for Buildings Sectional Committee had been approved by the Civil Engineering Division Council.

The by-product gypsum is calcium sulphate that occurs as by-product of industrial processes. They are formed by the action of sulphuric acid on calcium salts. By-product gypsum is also known as chemical gypsum or synthetic gypsum. Some of the important by-product gypsums are phosphogypsum, fluorogypsum or anhydrite and marine gypsum. With some control on the quality of by-product gypsum, it is suitable for producing plaster of quality grade. This standard lays down the requirements of by-product gypsum suitable for use in the preparation of plaster, blocks and boards.

Phosphogypsum is obtained as a by-product in the manufacture of phosphoric acid by wet process. It is a waste material posing serious problem of disposal. There is danger of water pollution if the material is discharged on the ground or in rivers, as the organic and inorganic content of this material would make the water unsuitable for human and animal consumption and for agricultural purposes. At present, it is used to some extent in alkaline soil reclamation and in the production of ammonium sulphate fertilizer. Phosphogypsum contains phosphates, fluorides, alkalies and organic matter as impurities and these impurities are known to adversely affect the setting and strength development of plaster made from it.

Fluorogypsum is produced as a by-product during the manufacture of hydrofluoric acid. It contains impurities, namely, calcium fluoride and some free acidic materials. The material remains unutilized at present.

Marine gypsum is obtained during the process of recovering common salt by solar evaporation of sea water. It contains impurities such as sodium chloride and clay adhering to it. Most of the salt manufacturers in the coastal regions of Gujarat, Maharashtra and Tamilnadu recover marine gypsum as a by-product of salt industry.

In the formulation of this standard, considerable assistance has been rendered by the Central Building Research Institute, Roorkee, as the standard has been prepared based on their research work.

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 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

BY-PRODUCT GYPSUM FOR USE IN PLASTER, BLOCKS AND BOARDS — SPECIFICATION

1 SCOPE

1.1 This standard covers the requirements of by-product gypsum suitable for use in the preparation of plaster, blocks and boards.

2 REFERENCES

2.1 The Indian Standards listed below are necessary adjuncts to this standard :

IS No.	Title
IS 1288 : 1982	Methods of test for mineral gypsum (<i>second revision</i>)
IS 2411 : 1963	Methods of chemical analysis of fluorspar (fluorite)
IS 2720 (Part 22) : 1972	Methods of test for soils : Part 22 Determination of organic matter (<i>first revision</i>)
IS 4905 : 1968	Methods for random sampling
IS 5741 : 1970	Methods for determination of pH
IS 6361 : 1971	Methods of colorimetric determination of phosphorus

IS No.

Title

IS 9497 : 1980

Method for determination of sodium and potassium) flame photometric)

3. CHEMICAL REQUIREMENTS

3.1 By-product gypsum shall conform to the requirements given in Table 1.

4 SAMPLING

4.1 Lot

In any consignment, all the packages from the same batch of manufacture shall be grouped together to constitute a lot.

4.1.1 Samples shall be selected and tested separately from each lot to determine its conformity or otherwise to the requirements of the specification.

4.2 The number of packages to be selected for the sample from a lot shall depend upon the size of the lot and shall be in accordance with col 1 and 2 of Table 2.

4.2.1 The packages for the sample shall be selected at random from the lot and in order to ensure the randomness of selection, the procedure given in IS 4905 : 1968 may be adopted.

Table 1 Requirements of By-Product Gypsum
(Clause 3.1)

Sl No.	Characteristic	Requirement			Methods of Test, Ref to
		Phospho-gypsum	Fluoro-gypsum	Marine gypsum	
(1)	(2)	(3)	(4)	(5)	(6)
i)	P ₂ O ₅ , percent by mass, <i>Max</i>	0.40	—	—	IS 6361 : 1971
ii)	F, percent by mass, <i>Max</i>	0.40	1.0	—	IS 2411 : 1963
iii)	Na ₂ O, percent by mass, <i>Max</i>	0.10	—	—	IS 9497 : 1980
iv)	K ₂ O, percent by mass, <i>Max</i>	0.20	—	—	IS 9497 : 1980
v)	Organic matter, percent by mass, <i>Max</i>	0.15	—	—	IS 2720 (Part 22) : 1972
vi)	CaSO ₄ .2H ₂ O, percent by mass, <i>Min</i>	85.0	90.0 (see Note 2)	85.0	IS 1288 : 1982
vii)	Cl as NaCl, percent by mass, <i>Max</i>	0.10	—	0.10	IS 1288 : 1982
viii)	pH of 10 percent aqueous suspension of gypsum, <i>Min</i>	5.0	5.0	6.0	IS 5741 : 1970

NOTES

1 If the impurities in by-product gypsum exceed the specified limits, it should be processed to bring down the level of impurities according to the standard requirements.

2 Fluorogypsum shall be in anhydrous form (as CaSO₄).

Table 2 Number of Packages to be Selected from the Lot

(Clause 4.2)

Lot Size (No. of Packages in the Lot)	Sample Size (No. of Packages to be Selected for the Sample)
(1)	(2)
Up to 100	3
101 to 150	4
151 to 300	5
301 to 500	7
501 and above	10

4.3 Number of Tests

The tests for chemical requirements shall be carried out on a composite sample prepared by thoroughly mixing equal quantities of by-

product gypsum taken from each of the packages selected in the sample.

4.4 Criteria for Conformity

All the test results of the composite sample shall satisfy the corresponding specified requirements.

5 PACKING AND MARKING

5.1 By-product gypsum shall be suitably packed in bags or containers. The following information shall be marked legibly on each package:

- a) Name of the material and manufacturer
- b) Date of manufacture, and
- c) Net mass.

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