भारतीय मानक IS 2542 (Part 1/Sec 1) : 2023

Indian Standard

जिप्सम प्लास्टर, कंक्रीट और उत्पाद — परीक्षण पद्धति

भाग 1 प्लास्टर और कंक्रीट

अनुभाग 1 जिप्सम प्लास्टर की सामान्य कंसिस्टेंसी का निर्धारण

(दूसरा पुनरीक्षण)

Gypsum Plaster, Concrete and Products — Methods of Test

Part 1 Plaster and Concrete

Section 1 Determination of Normal Consistency of Gypsum Plaster

(Second Revision)

ICS 91.100.10

भारतीय मानक ब्यूरो
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August 2023 **Price Group 5**

Building Limes and Gypsum Products Sectional Committee, CED 04

FOREWORD

This Indian Standard (Part 1/Sec 1) (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Building Limes and Gypsum Products Sectional Committee had been approved by the Civil Engineering Division Council.

Over the last few years, the consumption of gypsum and gypsum based product has increased. Gypsum is utilized in the manufacture of cement, plaster of Paris, dry wall, etc. The major source of supply of gypsum in the country is from the state of Rajasthan. It is also mined in Tamil Nadu, Uttar Pradesh and to a smaller extent in Gujarat, Jammu and Kashmir, and Maharashtra.

Calcined gypsum is used in the plasters and manufacture of plaster of Paris. It is also used in the manufacture of partition blocks, sheets and tiles, plaster and insulating boards, and for stucco and lattice works. Gypsum in crushed condition is utilized in Portland cement manufacture, where it acts as a retarder, controlling the setting time of cement. Gypsum blocks are also used as building stones. Ground gypsum, as filler, is utilized in paint, paper, rubber, textiles, etc. In pottery, gypsum is used for moulding purposes. Besides, gypsum rock is used as a flux in the smelting of nickel ores and in tin plate industry for polishing plates.

A number of Indian Standards on gypsum building materials covering specifications, code of practices, etc have been prepared with a view to assisting the gypsum industry in its development. In line with that, methods of test for gypsum plaster, concrete and products, IS 2542 was prepared in two parts in the year 1964 and revised subsequently in 1978.

Part 1 of IS 2542 covered, the methods of test for gypsum plaster and gypsum concrete, and Part 2 of IS 2542 covered, the methods of test for gypsum products.

In this revision it was decided to review and update the various existing test methods of gypsum, taking into consideration the latest international practices and developments in this field and the current practices in the country. The significant changes incorporated in this revision of IS 2542 (Part 1) are as follows:

a) New test method for determination of free water has been introduced;
b) New test method for determination of fineness has been introduced;
c) Test specimen clause has been elaborated;
d) Clause relating to the reporting of test results has been described separately; and
e) Reference to various Indian Standards has been updated.

In this revision, IS 2542 (Part 1) is split into separate sections adding two new parts. This standard (Part 1/Sec 1) covers normal consistency of gypsum plaster. The other standards in the series are:

Section 2 Determination of normal consistency of gypsum concrete
Section 3 Determination of setting time of plaster and concrete
Section 4 Determination of transverse strength of gypsum plaster
Section 5 Determination of compressive strength and dry set density of gypsum plaster
Section 6 Determination of soundness of gypsum plaster
Section 7 Determination of impact resistance of gypsum plaster by dropping ball test
Section 8 Determination of mass from coarse particles
Section 9 Determination of expansion of gypsum plaster
Section 10 Determination of sand in set gypsum plaster
Section 11 Determination of wood fibre content in wood fibre gypsum plaster
Section 12 Determination of dry bulk density
Section 13 Determination of free water
Section 14 Determination of fineness

(*Continued on third cover*)

Indian Standard

GYPSUM PLASTER, CONCRETE AND PRODUCTS — METHODS OF TEST

PART 1 PLASTER AND CONCRETE

SECTION 1 DETERMINATION OF NORMAL CONSISTENCY OF GYPSUM PLASTER

(Second Revision)

1 SCOPE

This standard (Part 1/Sec 1) covers the method of test for determining the normal consistency of gypsum plaster.

2 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards:

IS No.	*Title*
IS 2469 : 2023	Glossary of terms relating to gypsum (*second revision*)
IS 5513 : 1996	Vicat apparatus — Specification (*second revision*)

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 2469 shall apply.

4 OBJECTIVE

This test method is intended to determine the volume of water required for mixing gypsum plaster when conducting setting time tests and compressive strength tests. Since accuracy in determining normal consistency is most important in standardizing physical methods of testing cementitious materials, it is essential that this test be performed with great care.

5 APPARATUS

5.1 Modified Vicat Apparatus

The modified Vicat apparatus, as given in Fig. 1, shall have a movable brass tube, 6.3 mm in diameter and suitable length to fit the Vicat bracket. On the lower end of the tube, a conical plunger made of aluminum with an apex angle of 53° ± 0.5° and a height of 45 mm ± 0.5 mm shall be attached. The total mass of the tube and plunger shall be 35 g ± 0.5 g. The total weight may be increased by means of a weight screwed onto the tube. Suitable bushings shall be fixed in a frame for properly guiding and aligning the movement of tube vertically. The mould (*see* IS 5513) shall, however, be kept in an inverted position such that the inside diameter is 60 mm ± 0.5 mm at the base and 70 mm ± 0.5 mm at the top. Vicat apparatus as given in IS 5513 may be used for making of modified Vicat apparatus.

5.2 Mould

The conical ring mould is used as described in IS 5513, however the inside diameter is 60 mm ± 0.5 mm at the top and 70 mm ± 0.5 mm at the bottom.

5.3 Base Plate

The base plate for supporting the ring mould shall be non-porous and preferably glass plate and about 100 mm^2.

5.4 Balance

The balance is capable of weighing at least 500 g at an accuracy of ± 0.1 g.

5.5 Measuring Vessel

The measuring cylinder shall be available with accuracy not less than ± 1 ml.

5.6 Sodium Citrate

The sodium citrate is used as a retarder.

6 PROCEDURE

6.1 Clean the plunger, mould and base plate of the modified Vicat apparatus. Apply a thin coat of

petroleum jelly or other suitable leaks during the test.

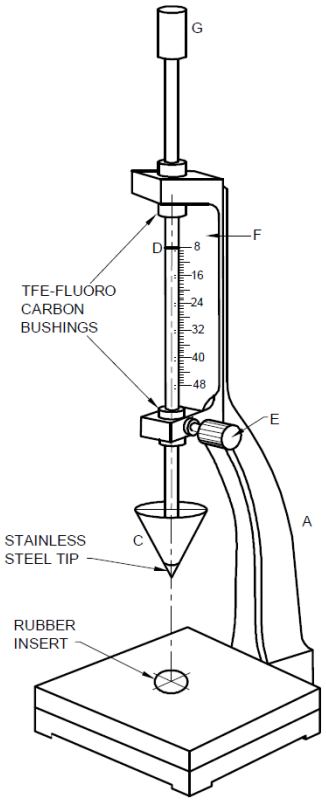
6.2 Sift a weighed quantity of the sample (200 g to 300 g as required to fill the mould) into a known volume of water. If the plaster is unretarded, add to the mixing water 0.2 g of sodium citrate as a commercial retarder per 100 g of sample. After allowing the sample to soak for 2 min, stir the mixture for 1 min to an even fluidity. Pour this sample into the Vicat mould, work slightly to remove air bubbles, and then strike off flush with the top of the mould. Wet the plunger of the modified Vicat apparatus and lower it to the surface of the sample at approximately the centre of the mould. Read the scale and release the plunger immediately. After the rod has settled, read the scale again.

6.2.1 Readings are reproducible on a retarded mix, and, therefore, in order to eliminate error, two or three determinations should be made on each mix, care being taken to have the mould completely filled and the plunger clean and wet.

7 REPORT

7.1 Gypsum plaster shall be considered of normal consistency when a penetration of 30 mm ± 2 mm is obtained when tested in accordance with **6.1** and **6.2**, the mass of the rod and plunger for this determination is to be 35 g ± 0.5 g. Normal consistency shall be expressed as the number of milliliters of water required to be added to 100 g of the gypsum plaster.

7.2 All gypsum mixtures containing aggregates shall be considered of normal consistency when a penetration of 20 mm ± 3 mm is obtained when tested in accordance with **6.1** and **6.2**, the mass of rod and plunger for these determinations is to be 50 g ± 0.5 g. Normal consistency shall be expressed as the number of milliliters of water required to be added to 100 g of the mixture.



Key

A Hinged support bracket
B Plunger support rod
C Conical plunger
D Graduation mark
E Lock screw
F Modified scale
G Weight

FIG. 1 MODIFIED VICAT APPARATUS (CONICAL PLUNGER METHOD)

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Building Lime and Gypsum Products Sectional Committee, CED 04

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(*Continued from second cover*)

This standard (Part 1/Sec 1) describes the method of test for determining the volume of water required for mixing gypsum plaster when conducting setting time and compressive strength tests.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

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 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Bureau of Indian Standards

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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