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(Reaffirmed 1995)

Indian Standard

METHODS OF TESTS FOR BUILDING LIMES

PART II DETERMINATION OF CARBON DIOXIDE CONTENT

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BUREAU OF INDIAN STANDARDS
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0. FOREWORD

0.1 This Indian Standard (Part II) was adopted by the Indian Standards Institution on 22 March 1973, after the draft finalized by the Building Limes Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Hitherto, methods of tests for assessing qualitative requirements of building limes were included in IS : 712-1964. For facilitating the use of these tests it has been decided to print these tests as different parts of a separate Indian Standard. This part covers determination of carbon dioxide content of building limes.

0.3 In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done ina ccordance with IS : 2-1960*.

1. SCOPE

1.1 This standard (Part II) covers method of test for determination of carbon dioxide content of building lime.

2. GENERAL

2.1 Preparation of the Sample — The sample for carrying out this test shall be prepared in accordance with **7.2** of IS : 712-1973†.

2.2 The distilled water (*see* IS : 1070-1970‡) shall be used where use of water as a reagent is intended.

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

†Specification for building limes (*second revision*).

‡Specification for water, distilled quality (*revised*). (Since revised).

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3. DETERMINATION OF CARBON DIOXIDE CONTENT

3.1 Apparatus and Reagents

3.1.1 A suitable form of apparatus is shown in Fig. 1. The system consists of a U-tube *A* with anhydrous granulated calcium chloride and another U-tube *B* with soda asbestos, funnel *C* with a glass stopcock *S* and a bent inlet glass tube (projecting below the acid level) is used to introduce hydrochloric acid into the generating flask *D*. Condenser *E* condenses most of the water and hydrochloric acid. The U-tube *F* contains zinc pallets to react with residual acid, if any. Bubbler *G* contains concentrated sulphuric acid to absorb moisture. The U-tube H_1 contains pumice stone, impregnated with anhydrous copper sulphate to remove traces of hydrogen sulphide. Pumice stone is prepared by crushing it to approximately 5 mm size, shifting it free from dust and then transferring 60 g of it to a casserole, it is then covered with a concentrated solution of 30 to 35 g of copper sulphate and then evaporated to dryness while stirring constantly. It is then heated for 3 to 4 hours at 150 to 160°C, cooled in a desiccator and preserved in a glass-stoppered bottle. U-tube *H* contains anhydrous granulated calcium chloride in one limb and anhydrous magnesium perchlorate in the other to remove the last traces of moisture. U-tubes J_1 and J contain both soda asbestos and anhydrous magnesium perchlorate in each limb to absorb carbon dioxide. U-tube *K* contains anhydrous granulated calcium chloride and anhydrous magnesium perchlorate in each limb to protect the end of the train against moisture. U-tubes are suspended from a cross bar *N*. Two retort stands *L* and *M* carry the cross bar *N*. All joints are made of stout-walled rubber tubing with the ends of the glass tubes touching each other. Means are provided to pass air through the system either under pressure or by suction.

3.1.2 *Dilute Hydrochloric Acid* — 1 : 4 (*v/v*). It shall be prepared by diluting hydrochloric acid (sp gr 1·16 and conforming to IS : 265-1962*) four times its volume with water.

3.2 Procedure — Accurately weigh about 2·5 g of the sample, transfer it into the flask *D* and add 20 to 40 ml of distilled water. Insert the glass stopper carrying the funnel arrangement and condenser and make sure that the apparatus is air-tight. Pass air through the system until the carbon dioxide absorption tubes J_1 and J attain constant mass. Close the stopcock (*S* and reconnect in the system the weighed carbon dioxide absorption tubes J_1 and J. Introduce 40 ml of hydrochloric acid into the flask *D* through funnel *C* and heat the flask carefully so that the gases pass through the sulphuric acid bubbler at a moderate rate. Allow the contents of the flask to boil after about 30 to 40 minutes. After 2 to 3 minutes of boiling, remove the flame and connect the flask to scrubbers *A* and *B* by means of stopcock *S* and pass air through the system for 20 minutes at a moderate rate. Keep

*Specification for hydrochloric acid (*revised*).

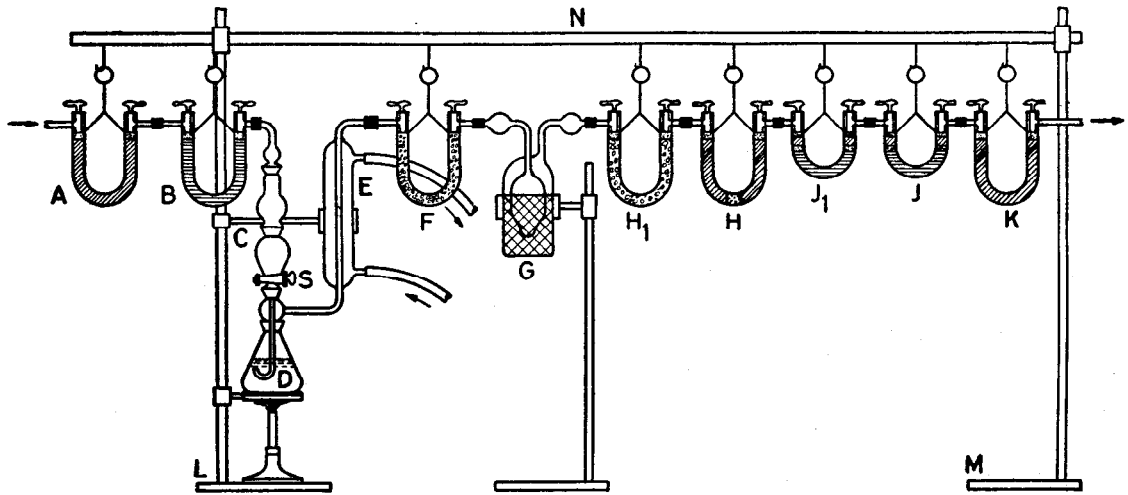

FIG. 1 ASSEMBLY OF APPARATUS FOR DETERMINATION OF CARBON DIOXIDE IN LIME

the absorption tubes J_1 and J at room temperature for 30 minutes and then weigh. The increase in mass denotes the carbon dioxide content in the sample.

3.3 Report of Test Results — The carbon dioxide content shall be reported as a percentage of mass of the sample taken.

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