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नेपाल गुणस्तर

NEPAL STANDARD

METHOD OF PHYSICAL TEST FOR HYDRAULIC CEMENT

PART 5 DETERMINATION OF INITIAL AND FINAL SETTING TIMES

Government of Nepal

Ministry of Industry, Commerce and Supplies

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1. SCOPE

1.1 This standard (Part 5) covers the procedure for determining the initial and final setting times of cement.

2. SAMPLING AND SELECTION OF TEST SPECIMEN

2.1 The samples of the cement shall be taken in accordance with the requirements of NS 386 and the relevant standard specification for the type of cement being tested. The representative sample of the cement selected as above shall be thoroughly mixed before testing.

3. TEMPERATURE AND HUMIDITY

3.1 The temperature of moulding room, dry materials and water shall be maintained at 27 ± 2°C. The relative humidity of the laboratory shall be 65 ± 5 percent.

3.2 The moist closet or moist room shall be maintained at 27 ± 2°C and at a relative humidity of not less than 90 percent.

4. APPARATUS

4.1 Vicat Apparatus - Vicat apparatus conforming to NS 123 (Part 4 – Annex A).

4.2 Balance - The balance shall conform to the following requirements:

On balance in use, the permissible variation at a load of 1000 g shall be ± 1.0 g. The permissible variation on new balance shall be one-half of this value. The sensibility reciprocal shall be not greater than twice the permissible variation.

NOTE 1 - The sensibility reciprocal is generally defined as the change in load required to change the position of rest of the indicating element or elements of a non-automatic indicating scale a definite amount at any load.

NOTE 2 - Self-indicating balance with equivalent accuracy may also be used.

4.3 Standard Weights -The permissible variations on weights in use in weighing the cement shall be as prescribed in Table 1.

TABLE 1 PERMISSIBLE VARIATION ON WEIGHTS
(Clause 4.3)

WEIGHT	PERMISSIBLE VARIATION ON WEIGHTS IN USE
g	g
(1)	(2)
500	±0.35
300	±0.30
250	±0.25
200	±0.20
100	±0.15
50	±0.10
20	±0.05
10	±0.04
5	±0.03
2	±0.02
1	±0.01

4.4 Gauging Trowel - Gauging trowel conforming to NS 123 (Part 4 – Annex B).

5. PROCEDURE

5.1 Preparation of Test Block - Prepare a neat cement paste by gauging the cement with 0.85 times the water required to give a paste of standard consistency. Potable or distilled water shall be used in preparing the paste. The paste shall be gauged in the manner and under the conditions prescribed in NS:123 (Part 4). Start a stop-watch at the instant when water is added to the cement. Fill the Vicat mould E with a cement paste gauged as above, the mould resting on a nonporous plate. Fill the mould completely and smooth off the surface of the paste making it level with the top of the mould. The cement block thus prepared in the mould is the test block.

5.1.1 Immediately after moulding, place the test block in the moist closet or moist room and allow it to remain there except when determinations of time of setting are being made.

NOTE 1 - Clean appliances shall be used for gauging.

NOTE 2 - All the apparatus shall be free from vibration during the test.

NOTE 3 - Care shall be taken to keep the needle straight.

5.2 Determination of Initial Setting Time - Place the test block confined in the mould and resting on the non-porous plate, under the rod bearing the needle (C); lower the needle gently until it comes in contact with the surface of the test block and quickly release, allowing it to penetrate into the test block. In the beginning, the needle will completely pierce the test block.

Repeat this procedure until the needle, when brought in contact with the test block and released as described above, fails to pierce the block beyond 5.0 ± 0.5 mm measured from the bottom of the mould. The period elapsing between the time when water is added to the cement and the time at which the needle fails to pierce the test block to a point 5.0 ± 0.5 mm measured from the bottom of the mould shall be the initial setting time.

5.3 Determination of Final Setting Time - Replace the needle (C) of the Vicat apparatus by the needle with an annular attachment (F). The cement shall be considered as finally set when, upon applying the needle gently to the surface of the test block, the needle makes an impression thereon, while the attachment fails to do so. The period elapsing between the time when water is added to the cement and the time at which the needle makes an impression on the surface of test block while the attachment fails to do so shall be the final setting time. In the event of a scum forming on the surface of the test block, use the underside of the block for the determination.

6. REPORTING OF RESULTS

6.1 The results of initial and final setting time shall be reported to the nearest five minutes