Initial and Final Time of Setting of Cement  
(AMC C191-82)

Scope:
This test covers determination of the time of Setting of cement by means of the Vicat needles. Setting means the change from a fluid to rigid state.

Time of initial set: is the time required for a cement paste to stiffen considerably represented by the 1mm needle penetration of 25 mm at less (35 mm penetration in B.S).

Time of final set: the time required for the cement to harden to a point where it can sustain some load (Represented by no penetration of Vicat needle).

Apparatus:
- Vicat Apparatus with:
  - Frame with scale
  - Free sliding 10 mm diameter plunger weight by 300 g, with needle 1mm diameter.
  - Conical Vicat ring with glass bottom plate. The top of ring is 70 mm diameter, the bottom is 60 mm diameter & the height is 40 mm.
- A mechanical mixer.
- A balance of accuracy of 0.05 % of the weight of the sample

Procedures:
1- Mix 650 g cement with a measured quantity of water as follows:
   - Place the water in the bowl.
   - Mix (Mechanical mixer) with low speed for 30 sec and stop for 15 sec and during this period scrape the paste adhering the sides of the bowl.
   - Mix with a medium speed for 60 sec.
2- Mix Cement paste into a shape of a ball, with gloved hands, toss ball six times through a free path of about 150 mm apart from hand to another.

3- Press ball into the large end Vicat ring and completely filling with Paste.

4- Remove any excess paste at the larger end. Place the ring on its larger end on the base of the plate & remove the excess paste at the smaller end & smooth the top of the specimen.

5- Place the specimen in a moist closet (Cabinet). The specimen should remain in the moist closet during all the test except when penetration is being made.

**Time of Setting determination:**

6- Center the ring under the rod such that the 1 mm needle is in contact with the paste surface & tighten the screw of the rod (after 30 min).

7- Release the rod after setting the scale to zero reading. Take the reading after 30 sec of release of the rod & read the penetration of the scale.

8- Repeat process every 15 min until initial set is achieved.

9- Each penetration trial should be more than 6 mm away from the others & more than 10 mm from the sides of the ring. Record the results of all penetration, then determine the time when a penetration of 25 mm is obtained. this is the initial setting time.

10- The final setting time is when the needle dose not sinks visible into the paste.

**Note:**

According to ASTM C150:

Initial time of setting: not less than 45 min.

Final time of setting: not more than 375 min.