

State of Nevada
Department of Transportation
Materials Division

METHOD OF TEST FOR STATIC SEGREGATION OF HYDRAULIC-CEMENT SELF-CONSOLIDATING CONCRETE USING THE COLUMN TECHNIQUE

SCOPE

This test method covers the determination of the static segregation resistance (stability) of hydraulic-cement self-consolidating concrete. The top-to-bottom retained coarse aggregate mass (weight) ratio is a measure of the stability of self-consolidating concrete (SCC).

APPARATUS

1. Column mold, PVC schedule 40 pipe 200 mm (8 in.) in diameter by 660 mm (26 in.) long, separated into three sections (See Figure 1).
2. Base plate, smooth, rigid, nonabsorbent material, and a minimum of 300 mm (12 in.) square.
3. Collector plate, smooth, rigid, nonabsorbent material, and a minimum of 510 mm (20 in.) square. The collector's plate center will have a hemispherical section measuring 215 mm (8.5 in.) wide (See Figure 2).
4. Sieve, 4.75 mm (No. 4), 300 mm (12 in.) diameter manufactured according to AASHTO M 92.
5. Trowel and hand scoop.
6. Balance, having a minimum capacity of 47.63 kg (105 lbs) and sensitive to 45.4 g (0.1 lb).

SAMPLING

Sampling shall be performed in accordance with Test Method Nev. T416.

PROCEDURE

1. Dampen the column mold and base plate. Wipe away any excess water with a moist cloth or damp sponge.
2. Place the base plate on level, stable ground. Center and attach the column mold on the base plate.
3. Using a hand scoop, fill the column mold in one lift without vibrating, rodding or tamping and within 2 minutes.

4. Using a trowel, strike off the surface of the concrete level with the top of the column mold. Remove any excess concrete from around the base of the column mold and base plate.
5. Allow the test specimen to stand for 15 ± 1 minute.
6. Hold the collector plate around the column mold to collect the portion of the test specimen from the top section using a horizontal rotating and twisting action of the PVC pipe section (See Figure 3).
7. Wash the portion of the test specimen collected from the top section of the column mold over the 4.75 mm (No. 4 sieve).
8. Using a towel, blot any free water from the retained coarse aggregate particles' surface to achieve a saturated surface dry (SSD) condition.
9. Determine the mass (weight) of the coarse aggregate.
10. Repeat steps 6-9 for the portion in the bottom section of the column mold. Remove the concrete from the middle section of the column mold and discard the concrete.

CALCULATIONS

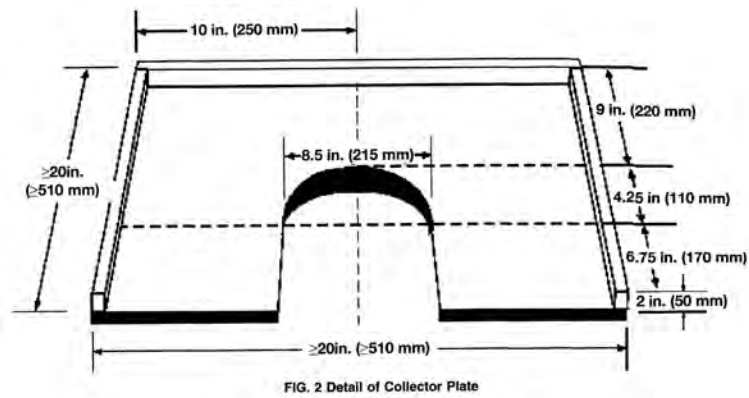
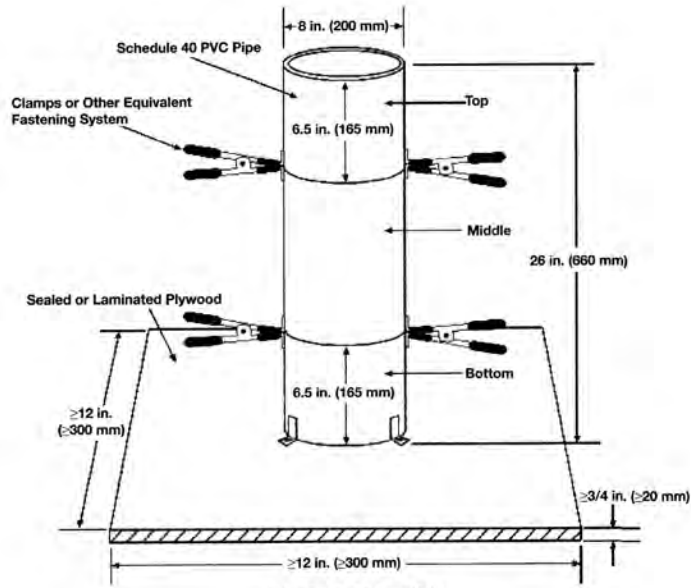
Calculate the Segregation Index, S, as follows:

$$S = 2 \left[\frac{(CA_B - CA_T)}{(CA_B + CA_T)} \right] * 100, \text{ if } CA_B > CA_T$$
$$S = 0, \text{ if } CA_B \leq CA_T$$

Where: CA_T = Mass (weight) of coarse aggregate in the top section
 CA_B = Mass (weight) of coarse aggregate in the bottom section

REPORT

1. Report the SSD mass (weight) of coarse aggregate obtained from the top and bottom sections of the column, CA_T and CA_B , respectively, to the nearest 45.4 g (0.1 lb).
2. Report the Segregation Index, S, to the nearest percent.



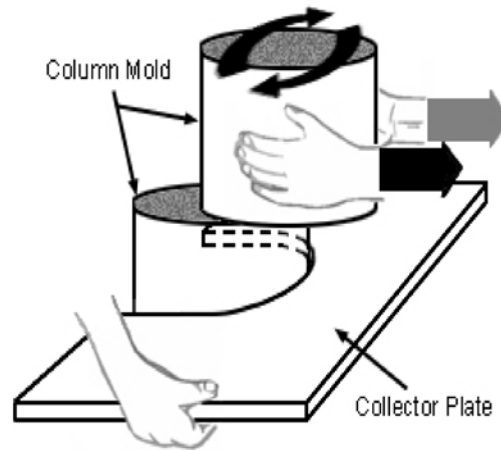


Figure 3. Horizontal Rotating and Twisting Action