2023 - 2025

HMA AGGREGATE CONSENSUS TESTS

PROFICIENCY EXAMINATION

APPLICANT_____

EMPLOYER_____

Uncompacted Void Content of Fine Aggregate
AASHTO T 304-17(2020): Method A

<table>
<tr><td>Trial#</td><td>1</td><td>2</td><td>R</td></tr>
<tr><td colspan="4">Material Preparation (state these requirements):</td></tr>
<tr><td>1. Split a cold-feed belt field sample over #4 sieve</td><td></td><td></td><td></td></tr>
<tr><td>2. Wash -#4 material over a #100 or #200 sieve and then oven-dry</td><td></td><td></td><td></td></tr>
<tr><td>3. Sieve oven-dry material into necessary size fractions</td><td></td><td></td><td></td></tr>
<tr><td colspan="4">Test Sample Preparation:</td></tr>
<tr><td>4. Weigh out the following quantities and combine

<table>
<tr><th>Individual Size Fractions</th><th>Mass, g</th><th colspan="3">OK?</th></tr>
<tr><td>Pass #8, Retained #16</td><td>44 ± 0.2</td><td></td><td></td><td></td></tr>
<tr><td>Pass #16, Retained #30</td><td>57 ± 0.2</td><td></td><td></td><td></td></tr>
<tr><td>Pass #30, Retained #50</td><td>72 ± 0.2</td><td></td><td></td><td></td></tr>
<tr><td>Pass #50, Retained #100</td><td>17 ± 0.2</td><td></td><td></td><td></td></tr>
</table>
</td><td></td><td></td><td></td></tr>
<tr><td colspan="4">Procedure:</td></tr>
<tr><td>5. Mix test sample with spatula until it appears homogeneous</td><td></td><td></td><td></td></tr>
<tr><td>6. Place funnel stand apparatus in clean, dry, non-warped retaining pan and center cylindrical measure under funnel</td><td></td><td></td><td></td></tr>
<tr><td>7. Block opening of the funnel with finger then pour test sample into the funnel</td><td></td><td></td><td></td></tr>
<tr><td>8. Using the spatula, level the material in the funnel with minimum effort.</td><td></td><td></td><td></td></tr>
<tr><td>9. Remove finger and allow material to fall freely into cylindrical measure while exercising care to avoid vibration/disturbance that could cause additional compaction of material in the measure</td><td></td><td></td><td></td></tr>
<tr><td>10. After funnel empties, and again being careful to avoid vibration, strike off excess aggregate with a single pass of the spatula with the width of the blade vertical using the straight part of its edge in light contact with the top of the cylindrical measure</td><td></td><td></td><td></td></tr>
<tr><td>11. After striking off excess aggregate, brush adhering material from the outside of the measure then obtain and record combined mass of measure and contents to the nearest 0.1 gram. NOTE: After strike-off, measure may be tapped lightly to compact sample to make it easier to transfer container to scale or balance without spilling any of the sample</td><td></td><td></td><td></td></tr>
<tr><td>12. Re-combine the sample from retaining pan and cylindrical measure and repeat the procedure (steps 5 through 11) for trial #2</td><td></td><td></td><td></td></tr>
<tr><td>13. Obtain and record mass of the empty cylindrical measure</td><td></td><td></td><td></td></tr>
</table>

Calculations:			
14. Calculate uncompacted voids for trials #1 and #2 as follows: $$U = \frac{V - \left(\frac{F}{G}\right)}{V} \times 100$$ Where: U = Uncompacted voids, nearest 0.1% V = Volume of cylindrical measure, ml or cm^3 G = Bulk dry specific gravity of fine aggregate F = Mass of aggregate in cylindrical measure, g			
15. Calculate average uncompacted voids (nearest 0.1%)			
PASS?			
FAIL?			

Proctor _____Date_____

Reviewer_____Date_____

Determining Percentage of Fractured Particles in Coarse Aggregate: ASTM D 5821-13 (2017)

Trial#	1	2	R
Material Preparation (state these requirements):			
1. Split a cold-feed belt field sample over #4 sieve			
2. Reduce the +#4 material to the appropriate testing size using splitter			
3. Wash test sample over #4 sieve and then oven-dry			
Particle Inspection Procedure:			
4. Determine the mass (weight) of the test sample to the nearest 0.1 gram and record as "Test Sample Weight"			
5. Place sample on clean, flat surface and begin inspecting individual particles by holding the suspected fractured face such that it is viewed directly. *If the area of the face constitutes at least ¼ of the maximum cross-sectional area of the particle*, it is considered a fractured face			
6. Place particle in one of three piles: 1) no fractured faces (N), 2) only one fractured face (F1), or 3) two or more fractured faces (F2)			
7. Having inspected the entire original sample, determine and record the weight of each of the three piles to the nearest 0.1 gram			
Calculations:			
8. Determine the percentages of the single and multiple fractured faces to the nearest whole % using the following equations: $$\%\text{Single FF} = P_1 = \frac{F1+F2}{F1+F2+N}\times 100$$ $$\%\text{Multiple FF} = P_2 = \frac{F2}{F1+F2+N}\times 100$$			
PASS?			
FAIL?			

Proctor _____Date_____

Reviewer_____Date_____

Plastic Fines in Graded Aggregates and Soils by use of the Sand Equivalent Test: AASHTO T 176-17

Trial#	1	2	R
Preliminary Material Preparation (state these requirements):			
1. Split a cold-feed belt field sample over #4 sieve			
2. Clean fines from +#4 particles and include with –#4 material			
3. Split or quarter –#4 material to yield slightly more than four 85 ml tin measures of –#4 material (500 – 750 grams)			
4. The remainder of the test can be performed on material in one of the following moisture conditions: 1) Air-Dry 2) Pre-Wet 3) Oven-Dry			
Air-Dry Sample Preparation (perform these requirements):			
5. Split or quarter enough air-dry –#4 material to fill one tin measure slightly rounded above brim			
6. While filling, tap tin measure on hard surface to consolidate material			
7. Strike off the tin measure level full with spatula or straightedge			
Procedure:			
8. Siphon 4 ± 0.1 inches of working calcium chloride solution into plastic cylinder			
9. Pour prepared sample from tin measure into cylinder using funnel to avoid spillage			
10. Tap bottom of cylinder sharply on heel of hand several times to release air bubbles and promote thorough wetting of sample			
11. Allow wetted sample to stand undisturbed for 10 ± 1 minutes (**state this requirement**)			
12. Place stopper in cylinder and loosen material from bottom of cylinder by partial inversion & shaking			
Shake the Cylinder: Choose and perform only one of the following methods			
13. Hand Method: Holding stoppered cylinder in horizontal position, shake vigorously in a horizontal linear motion from end to end, 90 cycles (one cycle is a complete back and forth motion) in approximately 30 seconds, using throw of 9 ± 1 inch			
14. Manual Shaker Method: Secure stoppered cylinder in device; reset stroke counter to zero; generate left-right oscillation by pushing with fingertips against right-hand steel spring (only during leftward motion) with sufficient force so that the pointer continually aligns with stroke limit marker; continue for 100 strokes			

15. Mechanical Shaker (Reference) Method: Secure stoppered cylinder in device and shake for 45 ± 1 seconds			
16. Following shaking, set cylinder upright on work table and quickly remove stopper			
17. As quickly as possible once the stopper is removed, insert the irrigator tube into the cylinder, start the solution flowing, and rinse material from cylinder walls as irrigator is lowered			
18. Force irrigator through material to bottom of cylinder with gentle stabbing and twisting action while solution flows from tip, flushing fines into suspension			
19. Continue to flush as many fines from sand as possible until fluid level approaches the 15" mark			
20. Withdraw irrigator without shutting off the fluid flow such that the final fluid level (as indicated by the bottom of the meniscus) is 15″			
21. Allow cylinder & contents to stand undisturbed for 20 minutes ± 15 seconds (**state this requirement**)			
22. At conclusion of 20 minutes ± 15 seconds time period, obtain and record "Clay Reading" (CR). If between divisions, round up to next highest 0.1″			
23. Gently and slowly lower weighted foot assembly into cylinder until foot comes to rest on top of sand layer			
24. Slightly tip the assembly until plastic disk indicator touches the side of the cylinder, observe the reading at the extreme upper edge of the indicator, subtract 10.0″, record result as "Sand Reading" (SR). If between divisions, round up to next highest 0.1″			
Calculations:			
25. Calculate Sand Equivalent using the following equation: $$\text{Sand Equivalent} = \frac{SR}{CR} \times 100$$ (calculate to nearest 0.1%; report to next highest whole %)			
PASS?			
FAIL?			

Proctor _____Date_____

Reviewer_____Date_____