

# Aggregate Technician

## 2025

### Part Two

## Proficiency Pack

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Employer: \_\_\_\_\_



# PART TWO

## AASHTO TM71: Deleterious Content of Aggregate PROFICIENCY CHECKLIST

Revised on 12/06/2019

Applicant: \_\_\_\_\_

	Trial #	1	2															
1. Material tested in an as received condition (may be dried at 140°F)																		
2. Reduce the sample according to the Maximum Size aggregate using the TM71 table below: Note: Surplus this amount for sieving																		
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Maximum Size Inches (mm)</th> <th style="width: 75%;">Minimum Sample Size of +4 material</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2 (50)</td> <td style="text-align: center;">10,000 grams</td> </tr> <tr> <td style="text-align: center;">1½ (37.5)</td> <td style="text-align: center;">9,000 grams</td> </tr> <tr> <td style="text-align: center;">1 (25.0)</td> <td style="text-align: center;">5,000 grams</td> </tr> <tr> <td style="text-align: center;">¾ (19.0)</td> <td style="text-align: center;">3,000 grams</td> </tr> <tr> <td style="text-align: center;">½ (12.5)</td> <td style="text-align: center;">2,000 grams</td> </tr> <tr> <td style="text-align: center;">⅜ (9.5)</td> <td style="text-align: center;">1,000 grams</td> </tr> <tr> <td colspan="2" style="text-align: center;">Maximum size is defined as the smallest sieve through which 100% of the material will pass.</td> </tr> </tbody> </table>	Maximum Size Inches (mm)	Minimum Sample Size of +4 material	2 (50)	10,000 grams	1½ (37.5)	9,000 grams	1 (25.0)	5,000 grams	¾ (19.0)	3,000 grams	½ (12.5)	2,000 grams	⅜ (9.5)	1,000 grams	Maximum size is defined as the smallest sieve through which 100% of the material will pass.			
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Maximum size is defined as the smallest sieve through which 100% of the material will pass.																		
3. Sieve the reduced sample over a #4 sieve and discard the passing material																		
4. Reweigh the +4 material to see if the sample meets the minimum size needed from the table.																		
5. Record the weight of the plus #4 material as the Original Mass																		
6. Set-up a workstation with a good light, a pan or spray bottle of water and several sorting pans																		
7. Obtain a handful, briefly wet a few particles and visually examine each particle <b>(Do not soak the particles in water)</b>																		
8. Examine each piece and separate the deleterious particles into specific groups according to specifications: (OFM, Hard Chert, Soft chert, Shale, etc.)																		
9. Record the weight of each group of deleterious found in the sample to the nearest whole gram																		
<b>NOTES:</b> <ul style="list-style-type: none"> <li>❖ Groups are defined in the test method and will vary based on product type as well as the presence of any given group</li> <li>❖ For 1002 material, keep soft chert separate as it will be included in both deleterious and hard chert</li> </ul>																		
10. Calculate the percentage of each group identified, report to nearest 0.1% for each category $P = \frac{C}{W} \times 100$ Where: P = Percentage of each deleterious component C = Actual weight (mass) of deleterious for each group W = Weight (mass) of test sample for the portion retained on the #4 sieve																		

PASS PASS

FAIL FAIL

Examiner: \_\_\_\_\_ Date: \_\_\_\_\_

# ASTM D 4791: Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate PROFICIENCY CHECKLIST

Revised on 12/06/2019

Applicant: \_\_\_\_\_

Sample Preparation	Trial #	1	2														
1. Sample in accordance with AASHTO R90																	
2. Determine the Nominal Maximum size of the aggregate sample																	
3. Reduce the sample using AASHTO R76 to the testing size using the Table below																	
<table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Nominal Maximum Size in. (mm)</th> <th style="text-align: center;">Minimum Mass lb. (g.)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">3/8 (9.5)</td> <td style="text-align: center;">2 (1000)</td> </tr> <tr> <td style="text-align: center;">1/2 (12.5)</td> <td style="text-align: center;">4 (2000)</td> </tr> <tr> <td style="text-align: center;">3/4 (19.0)</td> <td style="text-align: center;">11 (5000)</td> </tr> <tr> <td style="text-align: center;">1 (25.0)</td> <td style="text-align: center;">22 (10,000)</td> </tr> <tr> <td style="text-align: center;">1 1/2 (37.5)</td> <td style="text-align: center;">33 (15,000)</td> </tr> <tr> <td style="text-align: center;">2 (50)</td> <td style="text-align: center;">44 (20,000)</td> </tr> </tbody> </table>	Nominal Maximum Size in. (mm)	Minimum Mass lb. (g.)	3/8 (9.5)	2 (1000)	1/2 (12.5)	4 (2000)	3/4 (19.0)	11 (5000)	1 (25.0)	22 (10,000)	1 1/2 (37.5)	33 (15,000)	2 (50)	44 (20,000)			
Nominal Maximum Size in. (mm)	Minimum Mass lb. (g.)																
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1 (25.0)	22 (10,000)																
1 1/2 (37.5)	33 (15,000)																
2 (50)	44 (20,000)																
4. Determine to test either by Count or Mass																	
5. For Mass, sample oven-dried to constant mass at 230 ± 9°F (110 ± 5°C) For Count, sample is tested in an as is condition																	
6. Sieve analysis completed according to AASHTO T27, record the mass retained of each fraction in column A of the report																	
7. Obtained the fractions needed to test per Count or Mass: <b>By Particle Count:</b> From the Sieve Analysis each fraction from the #4 or 3/4" sieve and above as required by specification, with a minimum of 10% retained will be reduced to approximately 100 particles  <b>By Mass:</b> Use the material retained on the #4 or 3/4" sieve and above as required by MoDOT EPG specifications 1002, 1005, etc.																	
<b>Procedure: Method B - Flat and Elongated Particle Test</b>																	
1. Sort each particle in each size fraction into one of two groups: (1) Flat and elongated OR (2) Not flat and elongated																	
2. Proportional caliper device positioned at the proper ratio 5:1 or 3:1																	
3. Test each particle in the caliper by setting the larger opening to the particle length																	
4. Then place the particle through the opposite side of the caliper for thickness, if it slips through the smaller measure, the particle is flat and elongated																	
5. Weigh the amount of F&E of each fraction and record each to the nearest whole number on the report																	
<b>Calculations</b>																	
Percentage of flat and elongated particles calculated to nearest 1% for each sieve size as required																	

PASS    PASS

FAIL    FAIL

Examiner: \_\_\_\_\_ Date: \_\_\_\_\_

# AASHTO T 85: Specific Gravity and Absorption Of Coarse Aggregate

## PROFICIENCY CHECKLIST

Revised on: 09/21/2021

Applicant: \_\_\_\_\_

Procedure	Trial#	1	2
1. Sample obtained by ASHTO R90, and Reduced per AASHTO R76			
2. Screened on No. 4 sieve (4.75mm) or No. 8 (2.36mm) sieve			
3. Sample mass as follows: ½ in. or less – 2 kg; ¾ in. – 3 kg; 1 in. – 4 kg; 1 ½ in. – 5kg			
4. Washed to clean surfaces of particles			
5. Dried to constant mass at 230 ± 9°F (110 ± 5°C) and cooled to room temperature for 1 to 3 hours (for up to 1 ½ in. nominal maximum size, longer for larger sizes) <b>According to AASHTO T255.</b>			
6. Covered with water for 15 to 19 hours			
7. Prepared bath, overflowed the water for level, and adjusted temperature to 73.4 ± 3°F (23.0 ± 1.7°C)			
8. Rolled in cloth to remove visible films of water			
9. Larger particles wiped individually			
10. Evaporation avoided			
11. Weigh the SSD sample and Record all masses determined to the nearest 1g or 0.1% of sample mass.			
12. Sample immediately placed in the wire basket			
13. Entrapped air removed before weighing by shaking the wire basket while immersed.			
14. Mass determined in water at 73.4 ± 3°F (23.0 ± 1.7°C)			
15. Dried to constant mass at 230 ± 9°F (110 ± 5°C) and cooled to room temperature for 1 to 3 hours [or until aggregate has cooled to comfortable handling temperature, approximately <b>122°F (50°C)</b> ]			
16. Weigh the dry sample and record the mass			
17. Calculated the Bulk Specific Gravity and Absorption. <b>Report:</b> Specific Gravity for Asphalt (1002) to the nearest: <b>0.001</b> Concrete (1005) and M80 to the nearest: <b>0.01</b> And Absorption to the nearest: <b>0.1%</b>			

PASS    PASS

FAIL    FAIL

Examiner: \_\_\_\_\_ Date: \_\_\_\_\_

# AASHTO T 84: Specific Gravity for Fine Aggregate PROFICIENCY CHECKLIST

(rev 12/16/2019)

Applicant: \_\_\_\_\_

	Trial #	1	2
<b>Sample Preparation</b>			
1. Obtain a representative sample. (AASHTO R90)			
2. Mix and Reduce. (AASHTO R76)			
3. Sieved over #4 sieve, keep minus 4 material (approximately 1,000 g)			
4. Dried to constant mass at 230 ± 9°F (110 ± 5°C) <b>Note:</b> Oven drying not necessary if naturally moist condition is desired <b>Note:</b> See Provisional Tests 1-4 for materials that do not readily slump found in appendix			
5. Sample is covered with water, allowed to stand 15-19 hours			
6. Pycnometer calibrated at 73.4 ± 3°F record this weight to nearest 0.1g (This is "B" in the equation)			
7. After 15-19hrs, decant the excess water off the sample without loss of fines			
8. Calibrated pycnometer partially filled with water, set by the scale			
<b>STEPS 9-15 is the CONE TEST</b>			
9. Sample spread on a flat nonabsorbent surface			
10. Sample uniformly dried by a current of warm air			
11. Mold placed on flat nonabsorbent surface and filled to overflowing			
12. Tamped 25 times with 5 mm drop, and allowed to fall freely			
13. Sample removed from around base and mold lifted vertically			
14. Sample should retain the shape of the cone on first trial. <u>If slumps on the first trial, water added, sample covered and allowed to stand for 30min....then back to cone testing.</u>			
15. Drying continued, and slump test repeated at frequent intervals until sample slumps slightly = SSD Condition			
16. Immediately weighed 500±10g of the SSD sample to the partially filled pycnometer. (Report the mass to nearest 0.01 this is "S" in the equation)			
17. Pycnometer filled to 90% of total capacity and agitated to eliminate air bubbles. <b>Note:</b> Paper towel or isopropyl alcohol may be used to disperse foam on the water surface			
18. Pycnometer filled with water to the calibrated capacity line.			
19. When temperature of contents reach 73.4 ± 3°F (23.0 ± 1.7°C), towel dried the outside of the pycnometer and determined the total mass of the pycnometer, sample, and water to the nearest 0.1g (Report this as "C" in the equation)			
20. Sample removed from the pycnometer, placed in a pre-weighed pan and dried to constant mass at 230 ± 9°F (110 ± 5°C)			
21. Sample cooled in air at room temperature for 1.0 ± 0.5 hr. and dry mass determined to the nearest 0.1g, this is "A" in the equation.			
22. Calculations completed as needed: <b>Report:</b> Specific Gravity for Asphalt (1002) to the nearest: <b>0.001</b> Specific Gravity for Concrete (1005) and M6 to the nearest: <b>0.01</b> And Absorptions Report to the nearest: <b>0.1%</b>			

PASS    PASS

FAIL    FAIL

Examiner: \_\_\_\_\_ Date: \_\_\_\_\_