# Aggregate Technician

## 2024

### Part One

# Proficiency Pack

**Date:** _____

**Name:** _____

**Employer:** _____

# PART ONE

## AASHTO R90: Sampling of Aggregates
## PROFICIENCY CHECKLIST

Revised on 08/31/2020

Applicant: _____

**For all QC/QA or Acceptance sampling, record the time or location or both.**

| **Conveyor Belt Sampling – Sampling Device – Coarse/Mixed Aggregate**<br>NOTE: Automatic belt samplers may be used if properly maintained and inspected. | Trial 1 | Trial 2 |
|---|---|---|
| 1. Plant was operating at the usual rate. | | |
| 2. Random samples taken from a conveyor belt discharge taken from production. (avoid beg. or end) | | |
| 3. Sample taken from entire cross-section once in each direction without overflowing the device. | | |
| 4. Included all material from the sampling device into an clean empty container. | | |
| 5. Obtained 1 or more increments to form a field sample. | | |
| **Conveyor Belt Sampling – Template - Coarse/Mixed Aggregate** | | |
| 1. Conveyor belt stopped, locked and tagged out. | | |
| 2. Random samples taken from production. | | |
| - Avoided sampling at the beginning or end of a run | | |
| 3. Template placed on the belt to yield one increment. | | |
| 4. All material inside the template scooped into a proper container including fines. | | |
| 5. Obtained 1 or more increments to combine for a field sample. | | |
| **Stockpile Sampling – Flat Board – Coarse/Mixed Aggregate** | | |
| 1. Created a horizontal surface with a vertical face. | | |
| 2. Inserted board vertically against a vertical face to prevent sloughing. | | |
| 3. Discarded sloughed material. | | |
| 4. Obtained a sample from the horizontal surface close to the vertical face. | | |
| 5. Obtained at least one increment from; the top third, the middle third, and the bottom third of the stockpile. | | |
| 6. Combined to form a field sample. | | |
| **Stockpile Sampling - Sampling Tube - Fine Aggregate Only** | | |
| 1. The outer layer of the stockpile removed. | | |
| 2. Obtained a minimum of 5 random tube insertions on the stockpile. | | |
| 3. Combined to form a field sample. | | |
| **Stockpile Sampling – Loader – Coarse/Mixed Aggregate** | | |
| 1. Segregation avoided by re-blending the pile. | | |
| 2. Loader entered the pile with bucket at least 1 foot above the ground. | | |
| 3. Discarded first bucketful. | | |
| 4. Re-entered stockpile to obtain a full loader bucket of material | | |
| 5. Bucket tilted just enough for free flow, created small sampling pile. (Can go back for more). | | |
| 6. Back dragged the small pile to form a sampling pad. | | |
| 7. Randomly collected a min. of 3 increments with a shovel at least 1 foot from sample pile edge. | | |
| 8. Inserted the shovel excluded underlying material, placed in a clean dry container | | |
| 9. Combined increments to form a field sample. | | |
| **Roadway Base Sampling – In-Place – Coarse/Mixed Aggregate** | | |
| 1. Obtained at least 1 increment, using random number set for a QC/QA sample before compaction. | | |
| 2. If not a QC/QA sample, obtained at least 1 or more random increments for a field sample. | | |
| 3. Used a square nose shovel and or a metal template to mark the area. | | |
| 4. Shoveled the full depth of the material excluding underlying material. | | |
| 5. Combined increments to form a field sample. | | |
| | **PASS** | **PASS** |
| | **FAIL** | **FAIL** |

Examiner: _____ Date: _____

## AASHTO R76: Reducing Field Samples of Aggregate to Testing Size
## PROFICIENCY CHECKLIST

Revised on 10/14/2020

Applicant: _____

| Trial # | 1 | 2 |
|---|---|---|
| **Method A – Splitting** | | |
| **(8 chutes for Coarse CA, 12 chutes for Fine FA)** | | |
| 1. Material in an air-dried condition. | | |
| 2. Adjusted the openings to be 50% larger than the largest particle. | | |
| 3. Material spread uniformly on feeder from edge to edge. | | |
| 4. Rate of feed slow enough so that sample flows freely through chutes. | | |
| 5. Material in one receptacle re-split until desired weight was obtained. | | |

| **Method B - Quartering** | | |
|---|---|---|
| 1. Moist sample placed on clean, hard, level surface. | | |
| 2. Mixed by turning over at least 3 times with shovel. | | |
| 3. Conical pile formed. | | |
| 4. Pile flattened to uniform thickness and diameter of 4-8 times thickness | | |
| 5. Divided into 4 equal portions with shovel or trowel. | | |
| 6. Removed two diagonally opposite quarters, including all fines. | | |
| 7. Remaining quarters, mixed and quartered until reduced to desired sample size. | | |
| **NOTE:** The sample may be placed upon a canvas quartering cloth and a stick or pipe may be placed under the tarp to divide the pile into quarters. | | |

| **Method C – Miniature Stockpile (Damp Fine Aggregate Only)** | | |
|---|---|---|
| 1. Moist fine aggregate sample placed on clean, hard, level surface. | | |
| 2. Material thoroughly mixed by turning over three times. | | |
| 3. Small stockpile formed. | | |
| 4. Obtain at least 5 samples taken at random with sampling thief, small scoop, or spoon, combined to attain appropriate sample size | | |

| | PASS | PASS |
|---|---|---|
| | FAIL | FAIL |

Examiner: _____ Date: _____

**AASHTO T 255: Total Evaporable Moisture Content of Aggregate by Drying**
**PROFICIENCY CHECKLIST**
Revised on 12/06/2019

Applicant: _____

Employer: _____

| Trial # | 1 | 2 |
|---|---|---|
| 1. Representative test sample secured | | |
| 2. Test sample mass conforms to following from the T255 AASHTO Table: | | |
| 3. Mass determined to the nearest 0.1% | | |
| 4. Loss of moisture avoided prior to determining the mass | | |
| 5. Sample dried by a suitable heat source | | |
| 6. If heated by means other than a controlled temperature oven, is sample stirred to avoid localized overheating | | |
| 7. Sample dried to constant mass and mass determined to nearest 0.1% | | |
| 8. Moisture content calculated by: $\%\ \text{moisture} = \frac{\text{wet sample mass - dried sample mass}}{\text{dried sample mass}} \times 100$ | | |

| Nominal Maximum Size of Aggregate in. (mm) | Minimum Sample Mass Lbs. (g.) |
|---|---|
| #4 (4.75) | 1.1 (500) |
| ⅜" (9.5) | 3.3 (1,500) |
| ½" (12.5) | 4.4 (2,000) |
| ¾" (19.0) | 6.6 (3,000) |
| 1" (25.0) | 8.8 (4,000) |
| 1 ½" (37.5) | 13.2 (6,000) |

PASS PASS

FAIL FAIL

Examiner: _____ Date:_____

# AASHTO T11: Materials Finer Than No. 200 by Washing
# PROFICIENCY CHECKLIST

Revised on 10/14/2020

Applicant: _____

| Trial # | 1 | 2 |
|---|---|---|
| 1. Test sample dried to constant mass at 230 ± 9°F (110 ± 5°C). | | |
| 2. Test sample allowed to cool, and mass determined to 0.1%. | | |
| 3. #200 sieve checked for damage. Cover the #200 with a #8 or #16 sieve. | | |
| 4. Sample placed in a container and covered with water. | | |
| 5. Wetting agent added. (optional) | | |
| 6. Sample and contents of container vigorously agitated. Note: Mechanical washers maximum time is 10 min of washing. | | |
| 7. Wash water poured through the sieve nest. | | |
| 8. Wash water free of coarse particles. | | |
| 9. Operation continued until wash water is clear. | | |
| 10. Material on sieves returned to washed sample. | | |
| 11. Excess water decanted from washed sample only through the #200 sieve. | | |
| 12. Washed aggregate dried to constant mass at 230 ± 9°F (110 ± 5°C). | | |
| 13. Washed aggregate mass cooled and determined to 0.1%. | | |
| 14. Calculation: % less than #200 = $\frac{\text{Orig.dry mass} - \text{Final dry mass}}{\text{Orig. dry mass}}$ x 100 | | |
| | PASS | PASS |
| | FAIL | FAIL |

Examiner: _____ Date: _____

# AASHTO T 27: Sieve Analysis of Fine and Coarse Aggregate

**PROFICIENCY CHECKLIST**

Revised on 12/06/2019

Applicant: _____

| Trial# | 1 | 2 |
|---|---|---|
| **Fine Aggregate** | | |
| 1. Reduce per AASHTO R76 | | |
| 2. Minimum sample mass 500 g | | |
| **Coarse Aggregate** | | |
| 1. Reduce per AASHTO R76 used sample size determined from nominal maximum aggregate size, and MoDOT' s EPG chart | | |
| 2. Sample dried to constant mass at 230 ± 9°F (110 ± 5°C), weighed to nearest 0.1% and recorded | | |
| - AASHTO T11 may be performed at this point, washing material finer than No. 200 sieve, dried to a constant mass at 230 ± 9°F (110 ± 5°C), weight recorded, and weight loss calculated to nearest whole number | | |
| 3. Stacked appropriate sieves in descending order | | |
| 4. Poured sample in the top sieve without losing material | | |
| 5. Agitated **Manually** or **Mechanically** | | |
| - **Manual Sieving** continued until not more than 0.5% by mass of the total sample passes a given sieve during 1 minute of continuous hand sieving | | |
| - **Mechanical Sieving** Verified annually<br>- Timer verified/calibrated for sieving thoroughness. (Established by trial or checked by measurement on the actual test sample to meet the 0.5% criteria as in hand sieving above. (Records kept in the lab)<br>- Set at verified/calibrated time approximately 7-10 min.<br>- Or if timer not verified/calibrated, hand sieved afterwards for sieving accuracy | | |
| 6. Precautions taken to not overload sieves | | |
| 7. Weighed material in each sieve either by **Non-cumulative** or **Cumulative** method | | |
| 8. Total mass of material after sieving agrees with mass before sieving to within 1 gram per sieve used (If not, do not use for acceptance testing) | | |
| 9. Percentages calculated to nearest 0.1% and reported to nearest whole number | | |
| 10. Percentage calculations based on original dry sample mass, including the passing No. 200 fraction if T 11 was used | | |
| | PASS | PASS |
| | FAIL | FAIL |

Examiner: _____ Date: _____