Bituminous Technician

2026

Proficiency Pack

DATE: _____

Name: _____

Employer: _____

MoDOT TM 20
Measurement of Air, Surface, and Asphalt Mixture Temperature
PROFICIENCY CHECKLIST

Applicant: _____

Employer: _____

Trial #	1	2
Certificates or Report of Verification of Accuracy (Annual calibration) available?		
AIR		
1. Pick correct thermometer		
2. Location - *Mercury, Digital, Max-Min thermometers* - shade, no direct sunlight - position 4.5 feet above surface - safe location		
3. Document to nearest 2° F		

SURFACE		
4. Pick correct thermometer		
5. Procedure - *Spot Check Disc*: place on surface until needle stops moving. - *Infrared*; follow manufacturer recommendations. - *Mercury or Max-Min*; place under wooden box wait 5 minutes. - *Digital* ; follow manufacturer recommendations		
6. Document to nearest 2° F		

ASPHALT MIXTURE		
7. Pick correct thermometer		
8. Procedure - *Infrared*; follow manufacturer recommendations. - *Armored, BI-Therm Dial, or Digital*; place stem into mixture and wait until thermometer reading has stabilized		
9. Document to nearest 5° F		

PASS PASS

FAIL FAIL

Examiner:_____Date:_____

AASHTO R 66: Sampling Asphalt Materials
PROFICIENCY CHECKLIST

Applicant: _____

Employer: _____

Trial #	1	2

Describe procedure for taking a daily plant asphalt binder sample:		
1. Wear safety clothing, including insulated gloves, long sleeves, bring a marker, and tags.		
2. Obtain a clean dry sample container with lid: 1 pint friction top. Option: Write the sample information on the can before sampling.		
3. Open valve and discard at least 1 gallon of material.		
4. Shut off valve, place can underneath the spout.		
5. Open valve, fill can to within ½" of top.		
6. Shut off valve, wait until material quits flowing.		
7. Remove can and put on lid.		
8. Immediately wipe can with clean cloth, while hot. (do not use solvent to clean)		
9. Identify the sample on the can itself, include the ID Number, Supplier, Grade of the Binder, and Date.		
10. Place the sample in a sealed bag, and a MoDOT shipper if needed, deliver to the lab.		
	PASS	PASS
	FAIL	FAIL

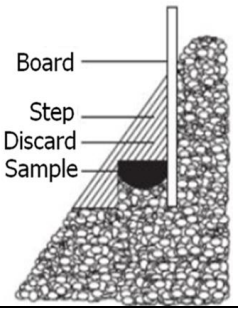
Examiner: _____Date:_____

AASHTO R 97
Sampling Asphalt Paving Mixtures
PROFICIENCY CHECKLIST

Applicant: _____

Employer: _____

Trial#	1	2
Describe procedure for taking a loose mix sample from:		
Roadway		
1. Obtain proper sample container for the application		
2. Use template or square nose shovel to define sample location		
3. Using a square nose shovel, obtain sample from defined area, including all fines and not disturbing underlying material		
4. Place collected material in non-absorbent, insulated container for transportation to lab		
5. Label the container: Material type, ID No., JMF, date, time, and location		

Stockpiles		
1. Remove 4 inches from the surface of the stockpile		
2. Create a step like below with a board and shovel and take the sample as shown 		
3. Obtain at least 1 increment from the top, middle, & bottom		
4. Combine to form a field sample		
5. Label the container: Material type, ID No., JMF, date, time, and location		

Streams		
1. Take 3 approximately equal increments with a sample catcher (Do not overflow the sample catcher)		
2. Combine to form a field sample		
3. Label the container: Material type, ID No., JMF, date, time, and location		

PASS PASS

FAIL FAIL

Examiner: _____ Date: _____

AASHTO R 47
Reducing Samples of Asphalt Mixtures to Testing Size
PROFICIENCY CHECKLIST

Name: _____

Company: _____

Mechanical Splitter Methods Trial #	1	2
Type A Splitter (Quartermaster)		
1. Level, clean, lightly coated with release agent?		
2. Position 4 receptacles to receive the quartered portions, without loss of material?		
3. Hopper doors closed and secured?		
4. Poured sample using a continuous or segmented pour from multiple directions around the hopper?		
5. Released the handle to drop the asphalt mixture through the dividers into the receptacles?		
6. Removed any material retained on surface into the appropriate receptacle?		
7. Samples taken from opposing corners for reintroduction into hopper?		
8. Split as many times as necessary for appropriate test?		

Type B Splitter (Riffle Splitter)		
1. Checked for cleanliness? (Optional: Riffle Splitter can be heated, not exceeding 230°F or 110°C)		
2. All surfaces in contact with the asphalt mixture coated with approved release agent?		
3. Properly placed the receptacles under the splitter		
4. Placed the sample uniformly in the hopper from edge to edge? (Can use a straight edge pan)		
5. Introduced the sample at a rate that allows free flow into sample containers?		
6. Above steps, repeated until sample size obtained?		

Quartering Method		
1. Placed asphalt mixture on a non-stick, clean, and level surface? (Approved asphalt release agent can be used)		
2. Thoroughly mixed the material by turning it over at least 4 times using a flat bottom scoop?		
3. After the last turning, formed conical pile depositing each scoop full on top of the previous one?		
4. Flattened the pile into uniform thickness and diameter by pressing down on the apex? (Diameter should be approximately 4 to 8 times the thickness)		
5 Pressed quartering templates completely down to bottom surface dividing the pile into four quarters?		
6. Removed two opposite quarters, including the fines?		
7. Repeated steps 2 through 6 until desired sample size was attained?		

	PASS	PASS
	FAIL	FAIL

Proctor/Auditor Signature: _____Date: _____

AASHTO T 329: Moisture Content of Asphalt Mixtures by Oven Method
PROFICIENCY CHECKLIST

Applicant_____

Employer_____

Trial#	1	2
Sampling		
Test sample obtained by AASHTO R 97		
Representative sample obtained; 1000 g minimum		

Procedure		
1. Mass of the sample container determined to the nearest 0.1 g		
2. Sample placed into container, distributed evenly, and initial temperature taken and recorded = original temperature		
3. Mass of sample and container determined to nearest 0.1 g		
4. Calculate the mass of the moist sample = **(M_i)**		
5. Sample placed in a drying oven 325 ± 25°F (163 ± 14°C) for 90 ± 5 minutes		
6. After 90 minutes, determined the sample mass = **(A)**		
7. Returned to oven for 30 ± 5 minutes		
8. After 30 minutes, determine the sample mass = **(B)**		

Calculations		
1. Calculate the percent change and determine if the sample is at constant mass $\% \text{ Change} = \frac{(A - B)}{A} X\ 100$		
2. Continued to dry the sample in 30 minute intervals until reached constant mass, when change in mass was ≤ 0.05%		
3. Sample and container cooled to original temperature, then weighed = (**M_f**)		
4. Percent Moisture calculated and reported to the nearest 0.01% $\text{Moisture Content, \%} = \frac{(M_i - M_f)}{M_f} X\ 100$		
	PASS	PASS
	FAIL	FAIL

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Proctor/Auditor: _____ Date: _____

AASHTO T 166
Bulk Specific Gravity of Compacted Asphalt Mixtures Using Saturated Surface Dry Specimens
PROFICIENCY CHECKLIST

Name: _____ Company: _____

SAMPLE PREPARATION Trial	1	2
1. Core samples taken from asphalt pavements. Note: Cores are to be oven dried overnight at 125 ± 5ºF (52±3ºC) and at successive 2 hr. intervals to constant mass or vacuum dried R79 to constant mass.		
2. Laboratory-compacted specimens. Note: Recently compacted samples not exposed to moisture do not require drying.		
3. Does this sample contain open or interconnecting voids that absorb more than 2%? YES=Switch to ASSHTO T331 NO=Continue with AASTHO T166		

PROCEDURE METHOD A - Suspension		
1. Specimens dry and at room temperature?		
2. Tared the scale to zero with immersed basket attached?		
3. Mass of dry sample in air determined?		
a. Reported weight to **0.1g**		
4. Immersed mass of sample determined?		
a. Immersed 4 ±1 min.?		
b. Water is at 77 ± 2°F? (25 ± 1°C)		
c. Reported weight to **0.1g**		
5. Saturated surface dry mass determined?		
a. Removed specimen from water?		
b. Quickly blotted specimen with a damp towel within 15 seconds? Note: Damp is when no water can be wrung from wet towel.		
c. Reported weight to **0.1g?**		

CALCULATONS AND REPORTING:		
Calculate Bulk Specific Gravity (Gmb) and report the result to the nearest **0.001g** $\frac{Weight\ in\ Air\ (A)}{Weight\ Surface\ Dry\ (B)\ -\ Weight\ in\ Water\ (C)}$		
Calculate Percent of Water Absorbed by Volume and report to nearest **0.01%**. (**Test T166 not valid if over 2.0% must redo testing using T133 Vacuum Seal Method.**) $\frac{Weight\ Suface\ Dry - Weight\ in\ Air}{Weight\ Surface Dry - Weight\ in Water} x100$		

PASS PASS

FAIL FAIL

Proctor/Auditor Signature: _____ Date: _____

AASHTO T269
Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
PROFICIENCY CHECKLIST

Name: _____

Company: _____

PROCEDURE	1	2
1. For Dense Bituminous Paving Mixtures		
a. Bulk specific Gravity determined by T166 (suspension) or T331 (Vacuum Sealing)?		
b. Theoretical maximum specific gravity determined by T209 (Rice Test) or from the JMF?		
2. Percent air voids calculated in accordance with test method T269?		

CALCULATONS:		
Theoretical Maximum Specific Gravity (Gmm) The Gmm can be found on the Job Mix Formula. OR from testing T209 (Rice Test) $$Gmm = \frac{A}{(A + D - E)}$$ • A=Dry Sample Mass in Air • D=Container & Water • E=Container, Water & Sample Report *Gmm* to nearest 0.001		
Bulk Specific Gravity (Gmb) $$Gmb = \frac{Weight\ in\ \text{Air}\ (A)}{Weight\ \text{Surface Dry}\ (B)\ -\ \text{Weight in Water}\ (C)}$$ Report Gmb to the nearest 0.001		
Percent Air Voids (Va) $$\text{Air voids } (V_a) = 100 * \left(\frac{G_{mm} - G_{mb}}{G_{mm}} \right)$$ *Or* $$\text{Air voids } (V_a) = 100 * \left(1 - \frac{G_{mb}}{G_{mm}} \right)$$ Report Air Voids to the nearest 0.1%		

PASS PASS

FAIL FAIL

Proctor/Auditor Signature: _____ Date: _____

MoDOT TM 54 (T287)
Determining the Asphalt Content of an Asphalt Mixture

PROFICIENCY CHECKLIST

Name: _____

Company: _____

Trial#	1	2
Preparation Note: AC = Asphalt Content		
1. Current 20 count – 1 minute stability test report, 3 months or less?		
2. Ran a 16-minute background daily or when conditions change?		
3. Background count within ±1 % of previous background test? - If not, more tests ran until two consecutive readings are w/n 1%?		

Procedure		
1. Obtained an asphalt mixture sample by R97, reduced by R47		
2. Tared a sample pan on the scale?		
3. Placed the sample in the pan in two lifts?		
4. Placed the sample on tared scale, check weight? (See JMF)		
5. Adjusted weight by adding or subtracting material from the pan to reach ± 5g of JMF sample weight? (do not segregate while adjusting)		
7. Compacted the sample in the pan using a leveling plate?		
8. Pressed down on the leveling plate to compact the sample level with top of the pan? • If the sample is not fitting, reheat the mix, try again.		
9. Rechecked the weight? Within ± 5g of JMF?		
10. Placed the sample pan in the nuclear machine and pressed the start/enter button (16 min count test)		
11. Get the results from a printed report or computer?		

Reporting		
1. Subtracted the moisture (T329), from the AC and report actual AC to the nearest **0.1%**		
2. Recorded the gauge readings for: Background count, Test count, and %AC on daily plant inspectors report or diary.		

PASS PASS

FAIL FAIL

Proctor/Auditor's Signature: _____ Date: _____

Binder Ignition T308

PROFICIENCY EXAMINATION

2026

APPLICANT'S NAME_____

EMPLOYER_____

AASHTO T 308: Asphalt Content by Ignition; Method A

Trial#	1	2	R
Pre-Production Oven Parameters Checklist: (Demonstrate oven setup)			
Input required parameters for routine production of a particular mix:			
1. Enter TEMP setpoint [chamber temperature]			
2. Enter CALIB. FACTOR [binder (aggregate) correction factor]			
Routine Production Ignition Oven Procedure: (Demonstrate test procedure with proctor instruction)			
3. Obtain weight of empty basket assembly			
4. Place ~½ of hotmix sample in each basket; move mix ~¾" away from sides; re-assemble basket. Cool to room temperature.			
5. Obtain total weight of sample plus basket then calculate initial weight of hotmix sample			
6. Enter initial sample WEIGHT			
7. Zero oven scale (push the number 0)			
8. After putting on safety gloves, face shield, etc., carefully load sample into oven, making sure basket is not touching walls; close door			
9. Check total weight: oven vs. exterior scale: No good if > 5 grams difference: Is it?			
10. Initiates burn-off program by pressing START/STOP			
11. After burn-off stops, remove and examine paper readout			
12. Again, with safety gear on, open oven door, remove basket & place on cooling rack. Cool to room temperature.			
13. Determine and record basket + specimen weight, then calculate and record final specimen weight (for manual calculations and/or verification of %AC).			
14. Obtain Calibrated %AC through calculations (NOTE: in the field, this value will automatically be on the printout tape)			
15. Correct the Calibrated %AC for moisture			
PASS?			
FAIL?			

Proctor_____Date_____

Reviewer_____Date_____