

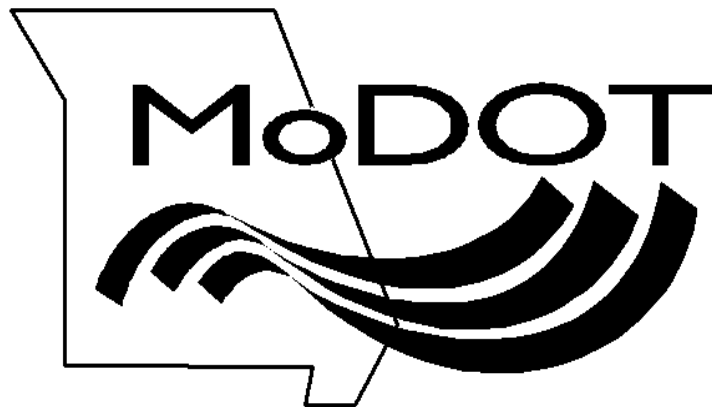
# Bituminous Technician

2021 - 2022  
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?		
<b>AIR</b>		
1. Pick correct thermometers		
2. Location <ul style="list-style-type: none"> <li>- <i>Mercury, Digital, Max-Min Thermometers</i></li> <li>- shade, no direct sunlight</li> <li>- position 4.5 feet above surface</li> <li>- safe location</li> </ul>		
3. Document to nearest 2° F		
<b>SURFACE</b>		
1. Pick correct thermometers		
2. Procedure <ul style="list-style-type: none"> <li>- <i>Spot Check Disc</i>; place on surface until needle stops moving</li> <li>- <i>Infrared</i>; point and shoot</li> <li>- <i>Mercury or Max-Min</i>; place under wooden box wait 5 minutes</li> </ul>		
3. Document to nearest 2° F		
<b>ASPHALT MIXTURES</b>		
1. Pick correct thermometers		
2. Procedure <ul style="list-style-type: none"> <li>- <i>Infrared</i>; point and shoot appropriate location</li> <li>- <i>Armored, digital, or BI-Therm Dial</i> ; place stem into mixture and wait until thermometer reading has stabilized</li> </ul>		
3. Document to nearest 5° F		

PASS PASS

FAIL FAIL

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

## AASHTO R 66: Sampling Asphalt Materials PROFICIENCY CHECKLIST

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

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

Trial #	1	2
<b>Describe procedure for taking a daily plant asphalt binder sample:</b>		
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.		
9. Identify the sample on the can itself, include the ID #, 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: \_\_\_\_\_

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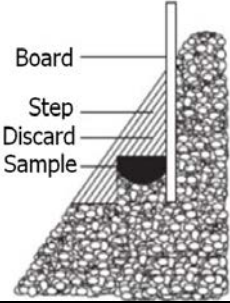
Proficiencies

09/24/2021

# AASHTO R 97 Sampling Asphalt Paving Mixtures PROFICIENCY CHECKLIST

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

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

Trial#	1	2
<b>Describe procedure for taking a loose mix sample from:</b>		
<b>Roadway</b>		
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		
<b>Stockpiles</b>		
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		
<b>Streams</b>		
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**

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

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

	Trial #	1	2
<b>Mechanical Splitter Methods</b>			
<b>Using Type A Splitter (Quartermaster)</b>			
Checked for cleanliness and applied approved asphalt release agent			
Positioned sample receptacles properly to receive the quartered portions, without loss of material			
Hopper doors closed and secured			
Poured sample using a continuous or segmented pour from multiple directions around the hopper			
Released the handle to drop the asphalt mixture through the dividers into the receptacles			
Removed any material retained on surface into the appropriate receptacle			
Samples taken from opposing corners for reintroduction into hopper			
Split as many times as necessary for appropriate test			
<b>Using Type B Splitter (Riffle Splitter)</b>			
1. Checked for cleanliness (optional: Riffle Splitter can be heated, not exceeding 230°F or 110°C)			
2. All surfaces coming into contact with 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 straight edge pan)			
5. Rate at which sample introduced allows free flow into sample containers			
6. Repeated until sample size obtained			
<b>Quartering Method</b>			
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 template 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

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

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

Applicant \_\_\_\_\_

Employer \_\_\_\_\_

	Trial#	1	2
<b>Sampling</b>			
Test sample obtained by AASHTO R 97			
Representative sample obtained; 1000 g minimum			
<b>Procedure</b>			
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 = <u>original temperature</u>			
3. Mass of sample and container determined to nearest 0.1 g			
4. Calculate the mass of the moist sample = <b>(M<sub>i</sub>)</b>			
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 = <b>(A)</b>			
7. Returned to oven for 30 ± 5 minutes			
8. After 30 minutes, determine the sample mass = <b>(B)</b>			
9. Calculate the percent change and determine if the sample is at constant mass  $\% \text{ Change} = \frac{(A - B)}{A} \times 100$			
10. Continued to dry the sample in 30-minute intervals until reached constant mass, when change in mass was ≤ 0.05%			
11. Sample and container cooled to <u>original temperature</u> , then weighed = <b>(M<sub>f</sub>)</b>			
12. Percent Moisture calculated and reported to the nearest 0.01%  $\text{Moisture Content, \%} = \frac{(M_i - M_f)}{M_f} \times 100$			

PASS    PASS

FAIL    FAIL

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

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

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

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

<b>METHOD A - Suspension</b>	<b>Trial</b>	<b>1</b>	<b>2</b>
*Test Specimens are laboratory-compacted specimens or cored from asphalt pavements.			
*Recently compacted laboratory samples (not exposed to moisture) do not require drying.			
<b>DRYING THE SPECIMEN</b>			
<b>Oven dried</b> the specimen to a constant mass			
a. Initially overnight (125 ± 5°F)			
b. Next day weigh in 2hr. intervals until change of less than 0.05%			
c. Cooled specimen to room temperature			
<b>OR</b>			
<b>Vacuum dried</b> the specimen to a constant mass (AASHTO R79)			
a. Completed at least (2) cycles in the Vacuum Drying Apparatus			
b. Specimen weighed after each cycle and reported to 0.1 g			
c. Continued vacuum cycles as needed until the weight change was less than 0.05%			
d. Cooled specimen to room temperature			
<b>Specimen Preparation:</b>			
a. Specimens dry and at room temperature 77 ± 9°F (25 ± 5°C)			
<b>Equipment Preparation:</b>			
a. Basket is immersed, centered & attached to scale			
b. Overflowed the bath until water flowed out of the outlet			
c. Adjusted temperature of bath to 77 ± 2°F (25 ± 1°C)			
d. Prepared damp-dry towel, (Wrung out excess water)			
<b>PROCEDURE</b>			
1. Dried Specimen to a constant mass (If needed)			
2. Specimen at room temperature 77 ± 9°F (25 ± 5°C)			
3. (Tared the scale with basket attached) Weighed specimen in air to nearest <b>0.1g</b> , reported as "A"			
4. Immersed the specimen in 77 ± 2°F (25 ± 1°C) water for 4 ± 1 minutes			
5. Recorded the weight under water to <b>0.1 g</b> , reported as "C"			
6. <b>Within 15 seconds:</b> Specimen was removed from the bath, blotted with damp-towel to SSD state, and weighed specimen to the nearest <b>0.1g</b> , reported as "B"			
7. Calculated Bulk Specific Gravity (Gmb), result reported to the <b>0.001</b>			
$\frac{\text{Weight in Air (A)}}{\text{Weight Surface Dry (B) - Weight in Water (C)}}$			
8. Calculated Percent of Water Absorbed by Volume, reported to nearest <b>0.01%</b> . <b>NOTE: Test not valid if over 2%</b>			
$\frac{\text{Weight Surface Dry} - \text{Weight in Air}}{\text{Weight Surface Dry} - \text{Weight in Water}} \times 100$			

PASS PASS

FAIL FAIL

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

Bituminous Technician

Proficiencies

09/24/2021

## AASHTO T269: Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures

Applicant \_\_\_\_\_

Employer \_\_\_\_\_

Calculate both % Density and % Air Voids using the following information:  
Report values to the correct decimal place.

**Mix Number** Super good

<b>Gmm=</b>	2.485
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SPECIMEN #	1	2	3	4	5	6
WEIGHT IN AIR	3690.3	3691.9	3692.8	3690.6	3698.1	3693.4
SSD WEIGHT	3714.4	3715.6	3715.3	3716.4	3722.8	3715.2
WT IN WATER	2100.9	2101.2	2108.0	2099.6	2106.1	2113.7
VOLUME						
SpG (Gmb)						
% AIR VOIDS						
% Density						

	Trial#	1	2
Answers Correct			
Reported to proper decimal place			

PASS PASS

FAIL FAIL

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



# MoDOT TM 54: Determining the Asphalt Content of an Asphalt Mixture

## PROFICIENCY CHECKLIST

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

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

	Trial#	1	2
<b>Note:</b> Student will be allowed to use the module instructions for following 3 items:			
1. Input a calibration transfer			
2. Run a background count test			
3. Run a test on a sample			
<b>Gauge Preparation Checklist</b>			
1. Have a current 20 – 1-minute stability test, 3 months or less			
2. Run a background daily or when conditions change			
3. Make certain proper calibration is being used			
<b>Explain a Nuclear Sample Preparation and Testing Procedure</b>			
1. Obtain proper bituminous mix sample			
2. Place sample in sample pan in two lifts			
3. Place on tared scale and check for proper sample weight			
4. Compact sample into the pan			
5. Recheck the weight			
6. Place sample pan in the nuclear machine and press start/enter button			
7. Record gauge results			

PASS PASS

FAIL FAIL

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