



Asphalt Plant Level I Technician Proficiency Test

Student Name (print) _____

Company Name (If VDOT- Dist./ Div.) _____

Company Address _____

Employer's Phone No. _____

Certification _____ Recertification _____ Check whichever applies.

		Test		Retest	
		P	F	P	F
AASHTO T30	Mechanical Analysis of Extracted Aggregates	_____	_____	_____	_____
AASHTO T166	Bulk Specific Gravity	_____	_____	_____	_____
AASHTO T209	Maximum Specific Gravity	_____	_____	_____	_____
AASHTO T269	Percent Air Voids in Compacted Specimens	_____	_____	_____	_____
VTM 102	Ignition Method (no oven calibration)	_____	_____	_____	_____
AASHTO T312	Gyratory Compaction (pill only using gyro)	_____	_____	_____	_____

Comments: _____

Student signature _____ Date _____

Proctor's signature _____ Date _____

Proctor's name (print) _____

**Mechanical Analysis of Extracted Aggregate
AASHTO T30 (1998)**

1. Nest of Sieves: upper sieve No. 10 or 16 (2.00 or 1.18mm) sieve.
lower sieve a No. 200 (0.075mm) sieve. _____

2. Wetting agent on hand. _____
3. Oven or hot plate capable of maintaining $230 \pm 9^{\circ}\text{F}$ ($110 \pm 5^{\circ}\text{C}$). _____
4. Balance capable of weighing to 0.1 % of sample mass (sensitive to 0.1 gram). _____
5. Sample consisting of all aggregate after extraction and weighed to nearest 0.1 grams. _____
6. Minimum mass of mix sample based on nominal maximum size. _____
7. Sample placed in container and covered with water. _____
8. Wetting agent added. _____
9. Contents agitated vigorously. _____
10. Wash water poured through nest of sieves. _____
11. Washing continued until wash water is clear. _____
12. Material placed in pan. _____
13. Material dried to constant mass at $230 \pm 9^{\circ}\text{F}$. _____
14. Material weighed to nearest 0.1gram. _____
15. Material sieved on specified sieve sizes. _____
16. Sieving continued until not more than 0.5 percent by mass of total sample passes a given sieve in 1 minute. _____
17. Each fraction of aggregate weighed. _____
18. Does summation of aggregate mass check against total washed dry mass within 0.2 percent? _____
19. All calculations performed correctly. _____

**Bulk Specific Gravity of Compacted Bituminous Mixtures
Using Saturated Surface-Dry Specimens
AASHTO T166 - 00 Method A**

1. Equipment

a. Balance and Suspension:

- 1. Conforms to M231 for class required (sensitive to 0.1 g). _____
- 2. Suspension from center of balance pan. _____
- 3. Suspension wire of smallest practical size. _____
- 4. Holder and sample completely immersed. _____
- 5. No trapped air bubbles exist under specimen. _____

b. Water Bath:

- 1. Equipped with overflow outlet. _____
- 2. Deep enough to completely immerse holder and sample. _____

c. Room Temperature Definition:

- 1. Room temperature $77 \pm 9^{\circ}\text{F}$ ($25 \pm 5^{\circ}\text{C}$). _____

2. Procedure

a. Molded specimens cooled to room temperature. _____

b. Mass of dry sample in air (A) determined in grams. _____

c. Sample immersed in water bath. _____

1. Immersed for 4 ± 1 minutes. _____

2. Water at $77 \pm 1.8^{\circ}\text{F}$ ($25 \pm 1^{\circ}\text{C}$). _____

3. Specimen weight in water (C) determined. _____

d. Sample removed and blotted with damp towel. _____

e. Saturated surface-dry mass determined (B). _____

f. Percent water absorbed determined to be less than 2 percent. _____

$\% \text{ Water absorbed} = (B-A)/(B-C) \times 100$

g. Bulk specific gravity calculated: $A/(B-C)$. _____

h. Bulk specific gravity reported to nearest 0.001. _____

Maximum Specific Gravity of Bituminous Mixtures AASHTO T209

1. Flask or bowl calibrated.
 - a. Flask or Bowl weighed suspended in water until it reaches a constant weight (B). _____
2. Sample obtained by splitting or quartering. [Indicate method used] _____
3. Mass of sample as follows (samples larger than the capacity of the container may be divided into suitable increments, tested and the results averaged). [Indicate particle & sample sizes used] _____

Largest Particle Size	Minimum Sample Size (g)	
2 in (50 mm)	6000	_____
1½ in (37.5 mm)	4000	_____
1 in (25 mm)	2500	_____
¾ in (19 mm)	2000	_____
½ in (12.5 mm)	1500	_____
⅜ in (9.5 mm)	1000	_____
No. 4 (4.75 mm)	500	_____
4. Particles of sample separated. _____
5. Care used not to fracture mineral fragments. _____
6. After separating, fine aggregate particles not larger than ¼ in (6.3 mm). _____
7. Sample at room temperature. _____
8. Flask or Bowl weighed in air (C). _____
9. Sample placed in flask or bowl and weighed in air (A). _____
10. Water at approximately 77°F (25°C) added to cover sample. _____
11. Vacuum increased until manometer reads 27.75 ± 2.25 mm Hg. _____
12. Entrapped air removed using partial pressure for 15 ± 2 minutes. _____
13. Container and contents agitated vigorously by mechanical device or manual shaking at intervals of 2 minutes. _____
14. Release of entrapped air facilitated by addition of wetting agent. (optional) _____
15. Release of vacuum by increasing pressure at a rate not exceeding 60mm Hg (8 kPa) per second. _____
16. Bowl and contents immersed in water for 10 ± 1 minutes _____
17. Weight recorded (D). _____
18. Maximum specific gravity calculated and reported to nearest 0.001.
 Max. specific gravity = (C-A) / (C-A)(D-B) _____

**Percent Air Voids in Compacted Specimens
AASHTO T269**

1. Bulk specific gravity determined according to AASHTO T166 _____
2. Maximum specific gravity determined according to AASHTO T209 _____
3. Percent air voids calculated in accordance with the following: _____

$$\text{Percent air voids} = 100 \times \left(1 - \frac{\text{bulk sp gr}}{\text{max sp gr}} \right)$$

**Ignition Method
Virginia Test Method 102 (VTM-102)**

1. Ignition Oven Calibration Factor Procedure ***Not required for Asphalt Plant Level I***

2. Sample Preparation:

a. If necessary, mixture warmed in pan ($257 \pm 9^\circ\text{F}$) to constant weight. _____

b. Sample obtained by splitting or quartering. [Indicate method used.] _____

c. Size of Sample _____

Nominal Maximum Aggregate Size	Minimum Sample Mass in grams	_____
1½	4000*	_____
1 in	3000*	_____
¾ in	2000	_____
½ in	1500	_____
⅜ in	1200	_____
No 4	1200	_____

* Sample may be split and results combined using weighted average

d. Sample weight does not exceed 800 grams of the minimum sample weight. _____

e. Sample baskets tared and weight recorded. _____

f. Sample divided into equal portions for top and bottom basket. _____

g. Baskets set in drip pan when loading and care taken not to lose fines. _____

h. Sample spread with heated spatula into thin even lift. _____

3. Determination of Asphalt Content by Ignition Method

a. Furnace preheated to 538°C (1000°F). _____

b. Correction (calibration) factor for specific mix design entered. _____

c. Sample weight with baskets determined and recorded to nearest gram. _____

d. Initial sample weight entered and verified in furnace controller. _____

e. Sample loaded into furnace and total weight (including baskets) verified prior to initiation of test. _____

**Ignition Method
VTM-102 (continued)**

- f. Sample removed promptly when audible stable indicator indicates constant weigh achieved. _____
- g. Sample allowed to cool to room temperature in safety enclosure. _____
- 4. Gradation Determination
 - a. Entire contents of sample baskets and drip pan emptied into flat pan, sample baskets cleaned into flat pan with a wire brush. _____
 - b. Sample weight determined to nearest 0.1 percent (1 gram for sample sizes greater than 1000 grams) for gradation _____
 - c. Gradation analysis performed in accordance with AASHTO T30. _____

**Standard Method for Preparing & Determining the Density of
Hot-Mix Asphalt (HMA) Specimens by Means of the Superpave Gyrotory Compactor
AASHTO T 312 (Was AASHTO TP 4)**

- 1. Gyrotory Compactor
 - a. One from approved list. _____
- 2. Molds (at room temperature)
 - a. Inside diameter 149.90 to 150.00 mm. _____
 - b. At least 250 mm high. _____
 - c. Walls at least 7.5 mm thick. _____
- 3. Ram and base plate faces
 - a. Ground flat. _____
 - b. Diameter of 149.50 to 149.75 mm. _____
- 4. Balance capable of weighing pills readable to 1 gram. _____
- 5. Forced draft oven thermostatically controlled to $\pm 3^{\circ}\text{C}$. _____
- 6. Thermometers armored, glass or dial-type with metal stems. _____
- 7. Verification of calibration (following items checked periodically)
 - a. Ram pressure _____
 - b. Angle of gyration _____
 - c. Gyration speed _____
 - d. LVDT or other continuous height recorder _____
 - e. Mold dimensions _____
 - f. Plate faces _____
 - g. Oven temperature _____

**Standard Method for Preparing & Determining the Density of Hot-Mix Asphalt (HMA)
Specimens by Means of the Superpave Gyrotory Compactor
AASHTO T 312 (continued)**

- 8. Preparation of Apparatus
 - a. Main power switch turned on for required warm up period. _____
 - b. Angle, pressure and gyration level set. _____
 - c. Bearing surfaces lubricated per manufacturer's instruction _____
- 9. **(Preparing Mix in Lab) not required for Asphalt Plant Level I** _____
- 10. Preparation of Mixture - Plant Prepared HMA
- 11. Compaction of Specimens
 - a. Mold, base plate, and upper plate (when required) removed from oven and paper disk placed on bottom of mold. _____
 - b. Mixture placed in mold in one lift, leveled, and paper disk and upper plate (when required) added. _____
 - c. Mold loaded into compactor and compaction started. (height recorded to nearest 0.1 mm) _____
 - d. Compactor shuts off when completed. _____
 - e. Mold removed and specimen extruded. _____
 - f. Paper disks removed. _____
 - g. Specimens conform to height requirements of 115 ± 5 mm. _____