Performance Examination - Asphalt

Standard Method of Test for Theoretical Maximum Specific Gravity (Gmm) and Density of Asphalt Mixtures (AASHTO T 209-19)

Candidate Name: _____ **NICET ID:** _____

Apparatus	Trial 1	Trial 2
Containers Use one of the six types below		
To be used for weighing in air and water		
Type A Bowl of glass, metal, or plastic		
Approx. 2000 mL capacity		
Cover fitted with rubber gasket and hose connection		
Type B Thick-wall filter flask or thick-wall vacuum desiccator		
Approx. 2000 mL capacity		
Provided with a rubber stopper with hose connection		
*To be used for weighing in air **only***		
Type C Small volumetric flask		
Approx. 2000 mL capacity		
Provided with a rubber stopper with hose connection		
Type D Intermediate-size heavy-wall glass pycnometer		
Approx. 4000 mL capacity		
Provided with suitable vacuum connection assembly consisting of a vacuum gauge, release valve and tubing connector, plus a tapered stopper device for maintaining consistent volume regulation		
Type E Metal vacuum pycnometer with a clear poly lid		
4500 mL capacity		
Type F Large size plastic pycnometer		
At least 10,000 mL capacity		
Provided with suitable vacuum connection assembly		
Hose opening covered with a small piece of wire mesh		
Balance With ample capacity and with sufficient sensitivity to enable the specific gravity to be calculated to at least four significant figures (to at least three decimal places) *For Type A: Balance equipped with a suitable suspension apparatus and holder to permit weighing the sample while suspended in water; wire suspending the holder should be the smallest practical size*		
Vacuum Pump or Water Aspirator Capable of evacuating air from the container to a residual pressure of 4.0 kPa (30 mm Hg) or less (preferably to zero) *When vacuum pump is used, a suitable trap of one or more 1000 mL filter flasks (or equivalent) should be used between the vacuum source and the vacuum vessel*		

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Apparatus (continued)	Trial 1	Trial 2
Residual Pressure Manometer Connected at the end of the vacuum line using an appropriate tube and either a "T" connector on top of the vacuum vessel or by using a separate opening in the top of the vessel		
Manometer or Vacuum Gauge Connected either directly to the vacuum source or in vacuum line close to the source; *A vacuum gauge may be used instead of manometer if it is traceable to NIST*		
Calibrated Liquid-Glass Thermometer Subdivisions and maximum scale error 0.5 °C (0.9 °F). Any other thermometric device of equal accuracy, precision and sensitivity is acceptable		
Water Bath (*Types A & B only*) Can maintain a constant temperature between 20 °C and 30 °C; Must be large enough for immersion of container and sample		
Bleeder Valve Attached to the vacuum train		
Apparatus for Supplemental Procedure for Mixtures Containing Porous Aggregate Not Completely Coated *If laboratory determines the specific gravity of mixtures containing porous aggregate, the following must be on hand*:		
Electric Fan		
Towel for Decanting Water from Aggregate		
Flask or Bowl Calibrated		

Procedures	Trial 1	Trial 2
1. Obtain sample by splitting or quartering		
2. Determine the mass of sample based on ASTM Standards		
3. Particles of the sample separated		
4. Care used not to fracture mineral fragments		
5. After separation, fine aggregate particles not larger than 6.3 mm (¼ in.)		
6. Dry to constant mass in the oven at 105 ± 5 °C (221 ± 9 °F) unless the mixture is laboratory prepared		
7. Sample at room temperature		
8. Place in tared flask or bowl; determine weight and net mass of sample		
9. Cover sample with water at approx. 25 °C (77 °F)		
10. Vacuum increased until manometer reads 3.7 ± 0.3 kPa (27.75 ± 2.25 mm Hg)		
11. A container within a container shall not be used		

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Procedures (continued)	Trial 1	Trial 2
12. Remove entrapped air using partial vacuum for 5 - 15 min		
13. Continuously agitate container and contents by a mechanical device or manually by vigorous shaking at intervals of about 2 min *Optional: The release of entrapped air facilitated by the addition of suitable wetting agent* Release of vacuum by increasing pressure at a rate not to exceed 8 kPa per second		
Weighing-in-water determination		
1. Suspend bowl (container) and contents in water at 25 ± 1 °C (77.0 ± 1.8 °F)		
2. Determine Net mass of contents in water after 10 ± 1 min immersion		
3. If the temperature is not 25 ± 1 °C (77.0 ± 1.8 °F), mass corrected to 25 °C (77 °F)		
Weighing-in-air determination		
1. Fill flask (container) with water		
2. Contents adjusted to 25 ± 1 °C (77.0 ± 1.8 °F)		
3. Determine mass of filled flask		
4. Determine weight of filled flask after 10 ± 1 min after removal of entrapped air completed		

First Attempt: Pass: _____ Fail: _____ **Second Attempt:** Pass: _____ Fail: _____

Exam Administration: Remote _____ In-Person _____

Comments:

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Examiner Name: _____ **Examiner Signature**: _____ **Date:** _____