



## SUPERPAVE VOLUMETRIC MIX DESIGN WORKSHOP 2007

This workshop is intended for technicians and engineers who understand and are experienced with the basic principles and procedures of asphalt concrete mixture design, testing, and voids analysis calculations. Applicants must be PENNDOT Certified Level 1 Plant Technicians to attend or equivalent for out of state participants. This workshop fulfills the volumetric mix design requirements for PENNDOT Level 2 Plant Technician certification. Classroom segments are included to familiarize participants with the Superpave system, along with 1-1/2 days of hands on laboratory testing to evaluate a proposed Superpave mixture design. The Superpave Workshop session consists of two ½ - day blocks bracketing 2 full days. This workshop has been updated to reflect the latest changes in test procedures, specifications, and implementation information. Time required for the various sections may vary as needed.

The participants should accomplish the following towards successful completion of the course based on the 70 percent passing grade:

- Conduct laboratory tests as required by the course in a proper manner (20 percent of the grade) – Minimum required score for laboratory performance to pass the course: 60 percent
- Prepare a simple report on the Superpave mix design prepared (20 percent of the grade) – See participant's reporting document attached. – Minimum required score for mix design report to pass the course: 60 percent
- Pass a written exam (60 percent of the grade) – Minimum required score for written exam: 65 percent

**Overall minimum required score to pass the course: 70 percent**

The report must be submitted on the last day of the course and should include the following.

1. The Results of the Volumetrics Calculations
2. Bulk and Apparent Specific Gravities of the Combined Aggregate
3. Effective Specific Gravity of the Aggregate
4. Maximum Theoretical Specific Gravity of the Mix
5. Bulk Specific Gravity of the Compacted Mixes
6. Percent Air Voids for the Compacted Mixes
7. Voids in the Mineral Aggregate (VMA)
8. Voids Filled with Asphalt (VFA)
9. Percent Density at  $N_{ini}$
10. Dust/AC Ratio
11. The Estimated Binder Content (i.e. the binder content giving design air voids content)
12. Volumetrics at the Estimated Binder content
13. Compaction Chart (percent density versus gyrations) for the Compacted Mix
14. Gradation Chart for the Aggregates Used

The formulas for calculation of volumetrics will be provided during the course.

The forms required for data recording and plotting compaction charts will be provided.

**NOTE: The course passing criteria are subject to change**

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### COURSE AGENDA

#### DAY 1, Tuesday LECTURE MODULE 1, PTI

<b>Time</b>	<b>Topic</b>
<b>1:00 – 1:45 p.m.</b>	Introduction to Superpave & Superpave Implementation
<b>1:45 – 2:15 p.m.</b>	Mix Design Concepts
<b>2:15 – 2:50 p.m.</b>	Materials Selection - Binder
<b>2:50 – 3:00 p.m.</b>	<b>Break</b>
<b>3:15 – 3:45 p.m.</b>	Materials Selection - Aggregate
<b>3:45 – 4:15 p.m.</b>	Design Using Superpave Gyratory Compactor
<b>4:15 – 4:45 p.m.</b>	Volumetric Requirements in Superpave Design

#### DAY 2, Wednesday LECTURE MODULE 2 AND LABORATORY MODULE 1, PTI

<b>Time</b>	<b>Activity</b>
<b>7:30 – 8:00 a.m.</b>	Morning refreshments in B107
<b>8:00 – 9:00 a.m.</b>	Superpave Mixture Design: Step by Step Procedure & Design Example (Room B107)
<b>9:00 – 9:10 a.m.</b>	<b>Break</b>
<b>9:10 – 10:35 a.m.</b>	Weigh & batch aggregates for gyratory compaction of specimens for mixture design & for AASHTO T283 (Room C101)
<b>10:35 a.m. – Noon</b>	Mixing specimens for Volumetric Mix Design (Room C101)
<b>Noon – 1:00 p.m.</b>	<b>Lunch</b>

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**DAY 2, Wednesday**

**LABORATORY MODULE 2: HANDS ON LABORATORY TESTING, PTI**

<b>Time</b>	<b>Activity</b>
<b>1:00 – 2:00 p.m.</b>	Gyratory compaction of mixture design specimens (Room C101)
<b>2:00 – 3:00 p.m.</b>	Conduct Tests for Fine Aggregate Sp. Gr. and Coarse Aggregate Sp. Gr. (Room C102)
<b>3:00 – 3:10 p.m.</b>	<b>Break</b>
<b>3:10 – 5:00 p.m.</b>	Demonstration: Sand Equivalent, Flat & Elongated particles, Coarse Agg. Angularity and Fine Aggregate Angularity (Room C102)
<b>5:00 p.m.</b>	<b>Dismissal</b>

**DAY 3, Thursday**

**LABORATORY MODULE 3: HANDS ON LABORATORY TESTING, PTI**

<b>Time</b>	<b>Activity</b>
<b>8:00 – 8:15 a.m.</b>	Orientation for Thursday Work <b>with Morning Refreshments</b>
<b>8:15 – 9:15 a.m.</b>	Discussion of Moisture Damage, AASHTO T283 and Design Calculations (Room B107)
<b>9:15 – 10:15 a.m.</b>	Measure bulk density of compacted specimens & Gmm for Volumetric Design (Room C111)
<b>10:15 – 10:30 a.m.</b>	<b>Break</b>
<b>10:30 a.m. – Noon</b>	Bulk density and degree of saturation of AASHTO T 283 compacted specimens (Room C111)
<b>Noon – 1:00 p.m.</b>	<b>Lunch</b>

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### DAY 3, Thursday

#### LABORATORY MODULE 4 – LECTURE MODULE 3: ANALYSIS AND CALCULATIONS, PTI

Time	Activity
<b>1:00 – 1:40 p.m.</b>	Conduct Indirect Tensile Tests on Conditioned and Dry Specimens for AASHTO T 283
<b>1:40 – 2:15 p.m.</b>	Review of the Rotational Viscometer, Superpave Shear Tester, and Indirect Tensile Tester
<b>2:15 – 2:30 p.m.</b>	<b>Break</b>
<b>2:30 – 5:00 p.m.</b>	Conduct Calculations, Analysis, and Report Preparation (Room B107)
<b>5:00 p.m.</b>	<b>Dismissal</b>

### DAY 4, Friday

#### LECTURE MODULE 4, PTI

Time	Topic
<b>8:00 – 9:00 a.m.</b>	Report Submission and Data Analysis (Room B107)
<b>9:00 – 10:00 a.m.</b>	Course Quiz
<b>10:00 – 10:15 a.m.</b>	<b>Break</b>
<b>10:15 – 11:15 a.m.</b>	Quiz review, question & answer period, course evaluation by participants
<b>11:15 a.m.</b>	<b>Dismissal</b>

#### NOTES:

- Times shown for all activities are approximate & may be varied as needed.
- Lunch will be provided for all course participants during the 2 full day sessions as indicated on this schedule. Refreshments will be provided each morning and during afternoon break.
- Parking permits for privately owned vehicles are available upon request to prevent ticketing by University police – these are for specific lots located only at PTI.
- You will need a calculator & pen/pencil to use in the laboratory and for the quiz.
- Long pants and closed toe shoes are required for testing activities in the laboratory – please dress appropriately for working with mechanical equipment and hot materials. Safety glasses, lab coats and gloves will be provided.
- Participants are responsible for their own hotel accommodations. A list of local hotels including telephone numbers is available upon request. It is not always possible for NECEPT to arrange for discounted room rates for workshop attendees, but be sure to ask if such rates are available when making your hotel arrangements.