

DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
Transportation Laboratory
5900 Folsom Blvd.
Sacramento, California 95819-4612

**PROVISIONAL METHOD OF TEST FOR LABORATORY CONDITIONING OF
DENSE-GRADED ASPHALT MIXTURES****EXPIRES 01/07/2026****A. SCOPE**

This provisional test method describes the procedure for laboratory conditioning of dense-graded asphalt mixture prior to compaction in the laboratory. The loose mixture from this test method is used to estimate the volumetric properties, cracking, rutting, and moisture damage resistance of the asphalt mixture soon after production and/or after in-service aging in the field.

B. REFERENCES

AASHTO R 47	Reducing Samples of Asphalt Mixtures to Testing Size
AASHTO R 30	Standard Practice for Short-Term Laboratory Conditioning of Asphalt Mixtures
AASHTO T 209	Standard Method of Test for Theoretical Maximum Specific Gravity (G_{mm}) and Density of Asphalt Mixtures
AASHTO T 312	Standard Method of Test for Preparing and Determining the Density of Asphalt Mixture Specimens by Means of the Superpave Gyratory Compactor
CT 125	Method of Test for Sampling Highway Materials and Products Used in the Roadway Pavement Structure Sections

C. SIGNIFICANCE AND USE

Asphalt mixtures have varying asphalt binder contents, different combinations of additives, aggregates, reclaimed asphalt pavement (RAP), reclaimed asphalt shingles (RAS), and other components. Mixtures may be prepared in the laboratory or may be produced in the plants. Mixtures may also be sampled and tested shortly after production; however, their performance may significantly change after several years of in-service aging in the field.

The short-term oven conditioning (STOC) for laboratory prepared mix is designed to allow for binder absorption during the mixture design and to simulate the plant-mixing effects on the mixture. The mid-term oven aging (MTOA) test is designed to simulate the field aging of mixtures in an accelerated manner. It specifically applies to cracking tests, as the cracking performance of mixtures is more sensitive to long-term aging. The rapid mid-term oven aging (RMTOA) is an accelerated alternative to the MTOA, offering a quicker turnaround time during production. This is a provisional test method to be used on selected pilot projects only.

D. APPARATUS

1. Pan – Shallow metal pan for heating 1-2 in. of the sample size of uncompacted asphalt mixtures. The pan must be large enough to hold the sample test size.
2. Boxes – Sample containers must be cardboard boxes 8 in. x 8 in. x 4 in. or 8-1/2 in. x 8-1/2 in. x 4-1/2 in.
3. Oven – Forced-draft oven, thermostatically controlled, capable of maintaining any desired temperature setting from room temperature to $176 \pm 3^{\circ}\text{C}$ ($348 \pm 5^{\circ}\text{F}$).
4. Spatula – Metal spatula or spoon suitable for stirring heated loose asphalt mixtures.

E. LABORATORY CONDITIONING PROCEDURES

E.1. REHEATING OF PLANT PRODUCED MIXTURES

The reheating procedure applies only to plant produced loose mixtures that have been sampled in accordance with CT 125.

Preheat oven for a minimum of 2 hours prior to conditioning so that when the oven is fully loaded and the air is on, the oven will equilibrate at $135 \pm 3^{\circ}\text{C}$ ($275 \pm 5^{\circ}\text{F}$) or to the mixture's compaction temperature $\pm 3^{\circ}\text{C}$ ($\pm 5^{\circ}\text{F}$), whichever is lower. Keep boxes folded closed during reheat to avoid excessive oxidation.

1. **In-box fresh sample:** Place boxes of the mixture in a preheated oven. Reheat the mixture for 1 hour. Mixtures in boxes will be considered as fresh if the mixture is workable enough to be split.
2. **In-box cold sample:** Place boxes of the mixture in a preheated oven. Reheat the mixture for 2 hours. Continue reheating for an additional 1 hour if the mixture is not sufficiently workable.
3. If the boxes have not been combined in the field, combine them in accordance with California Test 125.

4. Split the boxes of mixture to individual sample sizes in accordance with AASHTO R 47.

Note 1: The reheating process must only be applied to boxes that can be split immediately after reheating.

Note 2: Separate an appropriate amount of loose mix to measure the maximum specific gravity (G_{mm}) using AASHTO T 209. The oven conditioning of samples used for G_{mm} measurement must be consistent with the oven conditioning of samples used for compaction of specimens.

5. Place the test sample in a pan, and spread it to an even thickness equal to approximately 1-2 in.
6. Keep the pan with the mixture at controlled room temperature $25 \pm 6^\circ\text{C}$ ($77 \pm 10^\circ\text{F}$) for a minimum of 1 hour and not to exceed 72 hours. Samples left out for longer than 3 hours must be covered with aluminum foil or any suitable cover and kept out of direct sunlight to avoid excessive oxidation.

E.2. SHORT-TERM OVEN CONDITIONING (STOC) OF LABORATORY PREPARED MIXTURES

The Short-Term Oven Conditioning (STOC) procedure applies only to laboratory-prepared loose mixtures. STOC should be used to determine volumetric properties and conduct mechanical tests during mix design stage.

Preheat oven for a minimum of 2 hours prior to conditioning so that when the oven is fully loaded and the air is on, the oven will equilibrate at a temperature of $135 \pm 3^\circ\text{C}$ ($275 \pm 4.5^\circ\text{F}$) or to the mixture's mixing temperature $\pm 3^\circ\text{C}$ ($\pm 5^\circ\text{F}$), whichever is lower.

1. Place the uncovered pan with the mixture in a pre-heated oven for $4 \text{ h} \pm 5 \text{ min}$.
2. At the end of $4 \text{ h} \pm 5 \text{ min}$, remove the samples from the oven. Keep the pan with the mixture at controlled room temperature ($77 \pm 9^\circ\text{F}$) for a minimum of 1 hour and not to exceed 72 hours. Samples left out for longer than 3 hours must be covered with aluminum foil or any suitable cover and kept out of direct sunlight to avoid excessive oxidation.

E.3. MID-TERM OVEN AGING (MTOA)

The Mid-Term Oven Aging (MTOA) procedure applies to both lab-prepared and plant produced loose mixtures. MTOA should be used only for mixtures that will be compacted for cracking tests during mix design, and mix design verification.

Note 3: For mix design verification, MTOA applies only to plant-produced loose mixtures.

Preheat oven for a minimum of 2 hours prior to conditioning so that when the oven is fully loaded and the air is on, the oven will equilibrate at $100 \pm 3^{\circ}\text{C}$ ($212 \pm 4.5^{\circ}\text{F}$).

1. Place the uncovered pan with the mixture in a pre-heated oven for 20 h \pm 30 min.
2. At the end of 20 h \pm 30 min, remove the samples from the oven. Keep the pan with the mixture at controlled room temperature ($77 \pm 9^{\circ}\text{F}$) for a minimum of 1 hour and not to exceed 72 hours. Samples left out for longer than 3 hours must be covered with aluminum foil or any suitable cover and kept out of direct sunlight to avoid excessive oxidation.

E.4. RAPID MID-TERM OVEN AGING (RMTOA)

The Rapid Mid-Term Oven Aging (RMTOA) procedure applies only to plant produced loose mixtures. RMTOA should be used for mixtures that will be compacted for cracking tests during production.

Note 4: RMTOA may also be used during mix design verification to establish a correlation between MTOA and RMTOA.

Refer to the Safety Manual for your Laboratory.

Preheat oven for a minimum of 2 hours prior to conditioning so that when the oven is fully loaded and the air is on, the oven will equilibrate at $135 \pm 3^{\circ}\text{C}$ ($275 \pm 4.5^{\circ}\text{F}$).

1. Place the uncovered pan with the mixture in a pre-heated oven for 3 h \pm 5 min.
2. At the end of 3 h \pm 5 min, remove the samples from the oven. Keep the pan with the mixture at controlled room temperature ($77 \pm 9^{\circ}\text{F}$) for a minimum of 1 hour and not to exceed 72 hours. Samples left out for longer than 3 hours must be covered with aluminum foil or any suitable cover and kept out of direct sunlight to avoid excessive oxidation.

Note 5: It is recommended that RMTOA specimens be placed in the oven on a schedule matched to the time needed to compact gyratory specimens.

E.5. HEATING TO COMPACTION TEMPERATURE

Preheat oven for a minimum of 2 hours prior to testing so that when the oven is fully loaded and the air is on, the oven will equilibrate at the mixture's compaction temperature $\pm 3^{\circ}\text{C}$ ($\pm 5^{\circ}\text{F}$).

1. Place the uncovered pan with the mixture from E.1, E.2, E.3, or E.4 in a pre-heated oven for $2\text{ h} \pm 15\text{ min}$.
2. Stir the mixture after $1\text{ h} \pm 5\text{ min}$ to maintain uniform heating.
3. Proceed to compaction in accordance with AASHTO T 312.

Note 6: Any mixture that has been in the oven at compaction temperature for greater than $2\text{ h} + 15\text{ min}$ must be discarded.

F. REPORTING OF RESULTS

If required by the contract documents, submit test results electronically in accordance with the guidance documents found at the following link:

[DIME Website](#)

G. HEALTH AND SAFETY

It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Prior to handling, testing or disposing of any materials, testers must be knowledgeable about safe laboratory practices, hazards and exposure, chemical procurement and storage, and personal protective apparel and equipment.

**End of Text
(California Test 320 contains 5 pages)**