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DIVISION OF ENGINEERING SERVICES
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METHOD OF TEST FOR DETERMING FOAMING CHARACTERISTICS OF HOT BITUMEN

A. SCOPE

This test method describes the procedure for the foaming characteristics and optimum water content for foamed bitumen used in the production of warm mix asphalt by water injection.

B. REFERENCES

California Test 125 — Sampling Highway Materials and Products Used in the Roadway Structural Sections

C. APPARATUS

1. Machine or apparatus capable of producing foamed asphalt.
2. Metal Containers – Suitable for containing hot asphalt or foamed asphalt.
3. Wooden Yard Stick – Measurements indicated in $\frac{1}{4}$ in. increments accurate to $\frac{1}{4}$ in.
4. Timer – A stopwatch, clock, or other timing device having a precision of 1 s or less.
5. Balance – Accurate to 0.1 g.
6. Miscellaneous Apparatus and Tools – Heat resistant gloves and safety glasses or goggles.

D. DEFINITIONS

1. Expansion: Number of times a known volume of bitumen doubles itself when foamed with water.
2. Expansion Ratio: Measurement of the volume of foamed bitumen, calculated as the ratio of maximum volume of foam relative to the original volume of bitumen.
3. Half Life: Time it takes in seconds for the foam to collapse to half of its maximum volume after being foamed.

E. OBJECTIVE

The objective of this procedure is to determine the temperature and percent of additional water needed to produce the maximum expansion ratio and half-life for a grade and source of bitumen.

F. MATERIALS

1. 2000 g Bitumen - Bitumen shall conform to the requirements of the project special provisions for asphalt binder.
2. Water - Water will be potable.
3. Air Source.

G. PROCEDURES

1. Calibrate foaming equipment in accordance with manufacture's recommendation.

2. Each test must consist of heating a minimum 2000 g sample of bitumen to a temperature specified by the hot mix producer, and foaming two 500 g specimens at both the high and low end of the water injection rate recommended by the equipment manufacturer.
 - a. Maintain the required bitumen temperature for at least 5 min prior to testing.
 - b. Discharge 500 g of foamed bitumen into a preheated 140°F (± 60°C) steel drum at the required water content. Immediately after the foam discharge begins, start a stopwatch.
 - c. Using a ruler, measure the maximum height the foamed bitumen achieves in the drum.
 - d. Record the measurement as the maximum volume.
3. Using a stopwatch, measure the time in seconds the foam takes to dissipate to half of its maximum volume.
 - a. Record the time as the foamed bitumen's half-life.
4. Repeat the above procedure for each water content.
5. Report the half-life and expansion as the average of the two results for each water content.

H. 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.

Caltrans Laboratory Safety Manual is available at:

http://www.dot.ca.gov/hq/esc/ctms/pdf/lab_safety_manual.pdf

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(California Test 386 contains 2 pages)