STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING AGENCY

DEPARTMENT OF TRANSPORTATION DIVISION OF ENGINEERING SERVICES Transportation Laboratory 5900 Folsom Boulevard Sacramento, California 95819-4612



# METHOD OF TEST FOR CONCRETE ADMIXTURES

## A. SCOPE

Infrared spectra are prepared and compared to previously tested admixtures. Th procedures for this test method are divided into the following part(s):

1. Sample Preparation

#### B. REFERENCES

Caltrans Laboratory Safety Manual

#### C. PROCEDURE

#### PART 1. SAMPLE PREPARATION

#### 1A. APPARATUS

- 1. Infrared spectrophotometer, with printer and sample holding accessories.
- 2. Infrared grade, potassium bromide crystal (KBr).
- 3. Mixing device to pulverize and blend the dried sample with the potassium bromide crystals. An agate mortar and pestle and an electronic mixer/mill are examples that have proven to be satisfactory.
- 4. Laboratory hydraulic press with a 12 ton capacity.
- 5. Vacuum oven and a forced air-circulating oven.
- 6. Disposable aluminum weighing dish, about 2 <sup>1</sup>/<sub>2</sub> inches wide and <sup>3</sup>/<sub>4</sub> inches deep.
- 7. Pellet die with a vacuum hose attachment.

## 1B. PROCEDURE

- 1. Liquid sample preparation:
  - a. Liquid samples should not be evaporated directly in the vacuum oven. Instead, place 1 to 3 mL of the liquid sample in an aluminum dish. Then place the aluminum dish in a conventional oven at 50°C to 60°C for an overnight period. This should remove most of the moisture in the sample.
  - b. Place the aluminum dish containing the partially dried sample in a vacuum oven at 60°C and gradually increase the vacuum to 30 in. of mercury. Some materials may froth or foam excessively at this point, and it may be necessary to allow a small amount of air to bleed into the oven to control the frothing and to remove any last traces of moisture or volatile material.

- c. After the sample has stabilized, close the air-bleed valve on the oven and continue drying. Generally, 3 hr of drying in a vacuum oven is sufficient.
- d. Remove the sample from the oven and carefully transfer it to an agate mortar. Grind the sample to pass a Standard No. 80 sieve, and return it to the vacuum oven for approximately 1 hr.
- 2. Solid sample preparation:

Grind the solid to pass a Standard No. 80 sieve and dry overnight in an aluminum dish in the vacuum oven at 60°C and 30 in. of mercury.

- 3. Remove the sample from the oven. Grind 2 mg of the sample with 250 mg of KBr until it forms a uniform mixture. This breaks up any lumps of KBr and provides a preliminary mix to the specimen.
- 4. Transfer the mixed material to an electronic mixer and blend in accordance with the manufacturer's recommendations.
- 5. Place the powdered specimen into the pellet die and follow the manufacturer's instructions to prepare a suitable disk under vacuum. Thoroughly clean the die after each use. Be careful to avoid damaging the polished die faces.
- 6. Place the disk in an infrared spectrophotometer and collect the transmittance spectrum.

Test results are used for comparison purposes only. Each spectrum is compared with samples run previously. Two materials are considered similar if all of the absorption peaks match as to wavelength and relative magnitude.

## D. 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

Users of this method do so at their own risk.

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