

DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
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TEST METHOD FOR CONCRETE ADMIXTURES

CAUTION: Prior to handling test materials, performing equipment setups, and/or conducting this method, testers are required to read **SAFETY AND HEALTH** in Part 2 of this method. It is the responsibility of the user of this method to consult and use departmental safety and health practices and determine the applicability of regulatory limitations before any testing is performed.

SCOPE

Infrared spectra are prepared and compared to previously tested admixtures. This test method is divided into the following parts.

1. Sample Preparation
2. Safety and Health

PART 1. SAMPLE PREPARATION

A. 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 ½ inches wide and ¾ inches deep.

7. Pellet die with a vacuum hose attachment.

B. 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 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 inches 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 inches 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.

PART 2. SAFETY AND HEALTH

This method may involve hazardous materials, operations, and equipment. This method does not purport to address all the safety problems associated with its use. It is the responsibility of the user of this method to consult and establish appropriate safety

and health practices and determines the applicability of regulatory limitations prior to use.

Prior to handling, testing or disposing of any of waste materials, testers are required to read the Caltrans Laboratory Safety Manual. This manual contains information on general safety principles, standard operating procedures, protective apparel, disposal of materials and how to handle spills, accidents, emergencies, etc. Users of this method do so at their own risk.

REFERENCES:

Caltrans Laboratory Safety Manual

End of Test

(California Test 416 contains 2 pages)