

**ALDOT - 433**  
**PROCEDURE FOR TESTING BIODEGRADABLE EXTRACTANT SOLVENTS FOR APPROVAL**

**1. Scope**

- 1.1. This procedure establishes the testing requirements of biodegradable extractant solvents for inclusion on List II-19 of the Materials, Sources, and Devices with Special Acceptance requirements (MSDSAR) manual.
- 1.2. All Federal, State, and Local regulations shall be followed with when hauling, using, storing, and discarding extractants and rinse water. These requirements include fire ordinances as well as wastewater treatment regulations.
- 1.3. The Materials Safety Data Sheet (MSDS) for each product shall be followed closely to avoid fires and explosions. Storage of extractant-soaked rags is prohibited.

**2. References**

- 2.1. AASHTO Standards
  - AASHTO M 92 Standard Specification for Wire-Cloth Sieves for Testing Purpose
  - AASHTO M 231 Standard Specification for Weighing Devices Used in the Testing of Materials
  - AASHTO T 27 Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates
  - AASHTO T 164 Standard Method of Test for Quantitative Extraction of Asphalt Binder from Hot-Mix Asphalt (HMA)
  - AASHTO T 168 Standard Method of Test for Sampling Bituminous Paving Mixtures
- 2.2. Code of Federal Regulations
  - Title 29 of the Code of Federal Regulations, Hazard Communication (Subpart 1910.1200)
  - Title 40 of the Code of Federal Regulations, Part 261, Subpart D, Lists of Hazardous Waste

**3. Safety and Environmental Requirements**

- 3.1. The biodegradable extractant shall be non-carcinogenic and environmentally safe, and shall contain no asphalt solvents or petroleum hydrocarbons, such as gasoline, kerosene, or diesel fuel.
- 3.2. The biodegradable extractant shall be labeled in accordance with Title 29 Code of Federal Regulations Hazard Communication.
- 3.3. The biodegradable extractant shall contain no component listed in the Resource Conservation and Recovery Act (RCRA) Hazardous Waste Code of Federal Regulations (CFR), Title 40, Part 261, Subpart D, Lists of Hazardous Waste and shall contain no polychlorinated biphenyl's (PCB's).
- 3.4. The biodegradable extractant shall contain no volatile ingredients or flammable materials.
- 3.5. The biodegradable extractant shall have a rating no higher than zero for all National Fire Protection Association Hazard Codes. By use of the Hazardous Material Identification System

(HMIS) rating, a rating no higher than one is acceptable for health, and zero for flammability and reactivity codes.

- 3.6. The use of any hazardous extractants or unapproved extractants are not permitted for use in any ALDOT facilities or used by any ALDOT personnel.

#### **4. Apparatus**

- 4.1. A pan with a tight-fitting cover of sufficient size for the test sample to be spread out to a maximum depth of 1.5 in (40 mm), preferably an aluminum pan, 11 x 7 x 1.5 in (275 x 175x 40 mm).
- 4.2. A round plastic pail
- 4.3. A calibrated balance with 10 lb (5Kg) capacity to determine the mass of the combined sample, pan, and cover, with a readability and sensitivity of at least 0.1 g (AASHTO M-231)
- 4.4. Solvent: Biodegradable, high flash, non-toxic asphalt extractant
- 4.5. A thermostatically controlled, calibrated conventional or convection oven capable of maintaining a temperature of  $230 \pm 9^{\circ}\text{F}$  ( $110 \pm 5^{\circ}\text{C}$ ).
- 4.6. Sieves: As required by the gradation specifications and meeting the requirements of AASHTO M-92.
- 4.7. A scoop and heat resistant gloves

#### **5. Procedure**

- 5.1. Obtain a representative sample of the asphalt mixture in accordance with AASHTO T168.
- 5.2. Split or quarter the material until the mass of material as required in Table 1 of AASHTO T 164 is obtained.
- 5.3. Place the extraction sample in pan or pail and cover with extractant. The extractant shall be mixed as per the manufacturer's instructions. Gently agitate the sample frequently with a spatula or trowel allowing sufficient time (20-30 minutes for virgin mixtures; 45 minutes - one hour for recycle mixtures) for the extractant to dissolve the asphalt from the aggregate.
- 5.4. Decant extractant over a No. 8 (2.36 mm) sieve nested over a No. 200 (75  $\mu\text{m}$ ) sieve. Continue decanting with water until wash water is clear.
- 5.5. Care must be taken while agitating and decanting to prevent loss of particles
- 5.6. Dry sample to constant mass in an oven at a temperature of  $230 \pm 9^{\circ}\text{F}$  ( $110 \pm 5^{\circ}\text{C}$ ).
- 5.7. Visually inspect the sample, while stirring the aggregates, to ensure adequate and thorough removal of all asphalt from aggregates in sample. If the sample is not thoroughly cleaned by the extracting agent, perform a gradation as per AASHTO T 27 and visually inspect the individual gradation particles for asphalt removal. If the sample is not cleaned to a point where individual particles are not permitted to pass through a sieve due to the asphalt coating the particle, then do not recommend the extracting agent for approval.

## **6. Reporting**

- 6.1. Any biodegradable extractant that does not remove all the asphalt from the aggregates will be reported as a failing sample and will not be recommended for approval to the Product Evaluation Board (PEB)
- 6.2. Any biodegradable extractant that extracts the asphalt from the aggregates and leaves no oily residue will be recommended to the PEB for addition to list II-19 of the MSDSAR manual.