

## **ALDOT-399 TESTING OF HOT MIX ASPHALT MORTARS**

### **1. Scope**

- 1.1. This method covers the blending and specimen preparation of hot mix asphalt (HMA) mortars to predetermine the physical characteristics of mortars used in HMA.

### **2. Referenced Documents**

- 2.1. AASHTO Standards
  - 2.1.1. M231, Weighing Devices used in the Testing of Materials
  - 2.1.2. PP1, Accelerated Aging of Asphalt Binder Using a Pressurized Aging Vessel (PAV)
  - 2.1.3. TP1, Determining the Flexural Creep Stiffness of an Asphalt Binder Using the Bending Beam Rheometer (BBR)
  - 2.1.4. TP5, Determining the Rheological Properties of an Asphalt Binder Using the Dynamic Shear Rheometer (DSR)
  - 2.1.5. T240, Effect of Heat and Air on a Moving Film of Asphalt (RTFO)
- 2.2. ASTM Standards
  - 2.2.1. D4402, Viscosity Determinations of Unfilled Asphalts Using the Brookfield Thermosel Apparatus
  - 2.2.2. D4753, Evaluating, Selecting, and Specifying Balances and Scales for use in Soil and Rock Testing
  - 2.2.3. E11, Wire-Cloth Sieves for Testing Purposes
- 2.3. ALDOT PROCEDURES
  - 2.3.1. ALDOT-395, Stone Matrix Asphalt Mix Design

### **3. Apparatus for Preparation**

- 3.1. Balance, 2-kg capacity, sensitive to 0.1 g. The balance shall conform to the requirement of ASTM D4753, class GP2 or AASHTO M231, class G2.
- 3.2. Oven, capable of maintaining the needed temperature within  $\pm 10^{\circ}\text{F}$  ( $5^{\circ}\text{C}$ ).
- 3.3. Hot plate, at least 700-W capacity with adjustable temperature control.
- 3.4. Sample containers, capable of holding at least 100 g of filler and 200 g of liquid asphalt binder. A 6 oz. (0.18 L) seamless ointment tin is recommended.

- 3.5. Mixing tools, wooden tongue depressors, spatulas, and spoons.
- 3.6. Insulated gloves, for handling hot samples and equipment.

#### 4. Procedure

- 4.1. Dry respective aggregate fractions containing material passing the No. 200 (0.075 mm) sieve (as per ASTM E11) to constant weight (mass) at  $230 \pm 10^{\circ}\text{F}$  ( $110 \pm 5^{\circ}\text{C}$ ). Dry sieve these aggregates and collect the dust from each aggregate. Blend the fillers to meet the percent by volume on the job-mix-formula. An example of how to blend by volume can be found in ALDOT-395.
- 4.2. Place a quart can of pre-aged liquid asphalt binder into an oven set at  $330 \pm 10^{\circ}\text{F}$  ( $165 \pm 5^{\circ}\text{C}$ ) (see paragraph 5.1).
- 4.3. Weigh  $100 \pm 0.1$  g of minus No. 200 (0.075 mm) blended filler into the 6 oz. (0.18 L) seamless ointment tin and place into a  $350 \pm 10^{\circ}\text{F}$  ( $175 \pm 5^{\circ}\text{C}$ ) oven. The material should remain in the oven for at least 30 minutes.
- 4.4. Weigh into the filler the proper amount of liquid asphalt binder to the nearest 0.1 g.
- 4.5. Place the tin on the hot plate and hand mix with a spatula. Slowly add the proper amount of fiber (weighed to the nearest 0.1 g) and continue mixing until the mortar is homogeneous.
- 4.6. When asphalt-fiber pellets are used, either use loose fiber of the same type to create the mortar or use a high-shear mixer. Asphalt-pellet fibers will not blend into the filler under low-shear mixing conditions.

#### 5. Testing of Mortars

- 5.1. When performing Superpave Liquid Asphalt Binder testing of the mortar, the liquid asphalt binder should be aged following AASHTO T240 and/or PP1 prior to blending with fillers and fibers.
- 5.2. Follow ASTM D4402; except that readings should be taken as soon as the temperature stabilizes because the fillers will sink to the bottom over time.
- 5.3. Follow AASHTO TP5; except use a higher preheat temperature of  $136^{\circ}\text{F}$  ( $58^{\circ}\text{C}$ ). This is to insure that the specimen will adhere strongly to both plates.
- 5.4. Follow AASHTO TP1; except, using aluminum molds:
  - 5.4.1. Place the mold over the corner of the warm hot plate so that the mold is on the hot plate and the rubber O-rings are not.
  - 5.4.2. Using a wooden tongue depressor, gently tamp the mortar into the mold. A light coating of release agent (glycerin and talc) will assist in this procedure.
  - 5.4.3. Repeat step 5.4.2 until the mold is full of mortar.

5.4.4. Continue according to TP1.

## **6. Reporting**

6.1. Report as required in ALDOT-395.