

ALDOT-258-82
MECHANICAL ANALYSIS OF EXTRACTED AGGREGATE

1. Scope

This method of test covers a procedure for the determination of the particle size distribution of fine and coarse aggregate extracted from hot-mix asphalt mixtures, using sieves with square openings. The method described is a modification of AASHTO T 30 to allow its adaptation to a field procedure.

2. References:

- 2.1 AASHTO T 30 Standard Test Method for Mechanical Analysis of Extracted Aggregate
- 2.2 AASHTO T 164 Standard Method of Test for Quantitative Extraction of Asphalt Binder from Hot-Mix Asphalt (HMA)
- 2.3 AASHTO T 308 Standard Method of Test for Determining the Asphalt Binder Content of Hot-Mix Asphalt (HMA) by the Ignition Method
- 2.4 AASHTO M92 Standard Specification for Wire-Cloth Sieves for Testing Purposes
- 2.5 AASHTO M231 Standard Specification for Weighing Devices Used in the Testing of Materials

3. Apparatus

- 3.1. The apparatus shall consist of the following:
 - 3.1.1. Oven - capable of maintaining the temperature at $110 \pm 5^{\circ}\text{C}$ ($230 \pm 9^{\circ}\text{F}$), for warming the sample.
 - 3.1.2. Oven - capable of maintaining the temperature at 149 to 163°C (300 to 325°F), for drying the sample if the moisture content is not known.
 - 3.1.3. Balance - A balance shall conform to AASHTO M231, Class D for samples less than 5000 g, Class E for samples 5000 g or more.
 - 3.1.4. Pan - flat, of the appropriate size to warm test specimens.
 - 3.1.5. Vessel – a vessel of a sufficient size to contain the sample covered with water and to permit vigorous agitation without the loss of any sample.
 - 3.1.6. Wetting agent – Any dispersing agent, such as Calgon, Joy, or other detergent that will promote the separation of fine materials.

- 3.1.7. Sieves - The sieves with square opening shall be mounted on substantial frames constructed in a manner will prevent loss of material during sieving. Suitable sieve sizes shall be selected to furnish the information required by the specifications covering the material to be tested. The woven wire cloth sieves shall conform to the requirements of AASHTO M 92.

4. Sample

The sample shall consist of the entire lot or sample of aggregate determined according to AASHTO T 308 or AASHTO T 164. In using AASHTO T 164, only biodegradable non-toxic asphalt extraction solvent as per approved II-19 list of ALDOT's "Materials, Sources and Devices with Special Acceptance Requirements Manual" (MSDSAR) shall be used. The use of trichloroethylene, any hazardous solvents, or unapproved solvents are not permitted for use in any ALDOT facilities or used by or near any ALDOT personnel.

All local, State and Federal regulations must be followed with when hauling, using, storing, and discarding extractants and rinse water. These requirements include fire ordinances as well as wastewater treatment regulations. The Materials Safety Data Sheet for the reagents should be followed closely to avoid fires and explosions. Storage of extractant-soaked rags should be prohibited.

5. Procedure

- 5.1 The sample shall be dried until further drying at 230 +/-9°F (110° +/- 5°C) does not alter the mass 0.1 percent. The total mass of aggregate in the asphalt mixture being tested is the sum of the masses of the dried aggregates and the mineral matter contained extracted from the hot-mix asphalt mixture.
- 5.2 After drying, record the mass of the test sample and place the sample in a container and cover it with water. Add sufficient amount of wetting agent to assure a thorough separation of the material finer than the No. 200 (75 µm) sieve from the coarser particles. The contents of the container shall be agitated vigorously and the washwater immediately poured over a No. 8 (2.36 mm) sieve superimposed on a No. 200 (75 µm) sieve. The use of a large spoon to stir and agitate the aggregate in the wash water has been found satisfactory.
- 5.3 The agitation shall be sufficiently vigorous to result in the complete separation of the coarse particles from all particles finer than the No. 200 (75 µm) sieve and bring them into suspension in order that they may be removed by decantation of the washwater. Care shall be taken to avoid, as much as possible, the decantation of the coarse particles of the sample. The operation shall be repeated until the wash water is clear.
- 5.4 All material retained on the nested sieves shall be returned to the container. The washed aggregate in the container shall be dried to a constant mass at a temperature of

230 +/-5°F (110° ± 5°C) and weighed to the nearest 0.1 percent. The aggregate shall then be sieved over sieves of the various sizes required by specification covering the mixture. The weight of material passing each sieve and retained on the next shall be recorded. The summation of these various weights must check with the dried weight after washing within 0.2 percent of the total weight. The weights of fractions retained on the various sieves and the total passing the No. 200 (75 µm) sieve shall be converted to percentage by dividing each by the total weight of aggregate in the hot-mix mixture from 5.1.

5.5 For further information see AASHTO T-30.

6. Reporting

The results of the sieve analysis shall be reported as total percentages passing each sieve. Percentages shall be reported to the nearest whole number except for the percentage passing the No. 200 (75 µm) sieve, which shall be reported to the nearest 0.1 percent.