

ALDOT-324-83
REQUIREMENTS FOR PLANTS PRODUCING ASPHALT PAVEMENT
MIXTURES

1. Scope

- 1.1 This procedure outlines the requirements for plants producing asphalt pavement mixtures for Department projects. All plants shall meet or exceed the following requirements, in addition to the requirements of AASHTO M 156.

2. Referenced Documents

- 2.1 [ALDOT Specifications](#)
106 Control of Materials
107 Legal Relations and Responsibility to Public
- 2.2 [ALDOT Procedures](#)
155 Asphalt Plant Check List
349 Testing Equipment for Asphalt Mixtures
374 Certification Program for Hot-Mix Asphalt Technicians
- 2.3 AASHTO Standards
T 40 Sampling Bituminous Materials
M 156 Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures
- 2.4 ASTM Standards
C 70 Surface Moisture in Fine Aggregate

3. Plant Requirements

- 3.1 Inspection: All plants providing asphalt mixtures to Departments projects shall be inspected annually by the Department in accordance with ALDOT-155.
- 3.2 Uniformity and Control of Asphalt Mixtures: Asphalt Plants shall be equipped to mix any required size of aggregate, recycled asphalt pavement (RAP), reclaimed asphalt shingles (RAS), and asphalt binder from stockpiles, bins, or containers. The operation of the plant shall ensure the production of asphalt mixtures meeting Department specifications.
- 3.3 Warm Mix Asphalt (WMA) Additives: All mechanisms used to introduce WMA additives shall be capable of uniformly feeding and metering the additive. Depending on the WMA process, the plant should be equipped with automatic controls to monitor the feed system and interrupt plant production if there is an interruption in the feed process.
- 3.4 Material Approval: All asphalt materials, additives, processes, and mixtures shall be approved by the Materials and Tests Engineer.
- 3.5 Quality Control Plan: The plant quality control plan shall include a laboratory fully equipped to sample and test asphalt materials and asphalt mixtures. The laboratory shall meet the requirements of Section 106 and ALDOT-349.

- 3.6 Certified Technician: In accordance with ALDOT-374, the plant shall have on staff a certified asphalt technician capable of performing all the required asphalt tests to ensure that the asphalt mixtures produced by the plant meet Department specifications.
- 3.7 Sampling Tap and Valve: Asphalt binder shall be sampled using a tap and valve device as described in AASHTO T 40. The sampling device shall be accessible, kept clean, and located on the storage tank or in the in-line feed between the pump and the return discharge.
- 3.8 Asphalt Binder Storage: The asphalt binder storage tank shall have adequate capacity to allow for the circulation of the asphalt binder between the storage tanks and the proportioning units during the entire production operation. Storage tanks for asphalt binder shall have the capability of heating the asphalt binder to maintain the required temperature. Metering devices shall be calibrated accurately to within 1 percent of the actual weight being measured and shall be accessible for measuring the volume of asphalt binder at any time.
- 3.9 Cold Aggregate Feeders: Plants shall be capable of uniformly feeding the aggregates into the dryer such that production and temperature are uniform.
 - 3.9.1. Bins shall be interlocked such that an interruption in production will occur with inadequate flow from any bin (not applicable to batch plants). Plants shall allow for convenient means of sampling the full flow of aggregate from each bin and from the composite aggregate blend. The cold feed system shall be capable of diverting aggregate flow from each bin for calibration purposes.
 - 3.9.2. Each bin shall be equipped with low-level indicators. Audible and/or visual alarms shall be provided to indicate when the aggregate bin becomes empty or the flow becomes restricted.
- 3.10 Aggregate Control: Plants shall be capable of removing oversized materials. Aggregate control shall be based on frequent samples from each component aggregate as well as the composite aggregate blend.
- 3.11 RAP/RAS: Plants utilizing Recycled Asphalt Pavement (RAP) and/or Reclaimed Asphalt Shingles (RAS) shall be equipped with mechanical means for feeding the desired weight of RAP and/or RAS into the mix. Electronic belt weighing devices shall be used to monitor the flow of RAP/RAS. RAP/RAS flow shall be interlocked with virgin aggregate flow. Ratios of RAP and/or RAS to virgin aggregate shall be controlled by weight.
- 3.12 Asphalt Mixture Storage: The storage system shall be capable of conveying the asphalt mixture from the plant to storage without loss in temperature and without excessive segregation or oxidation of the mix. The storage may be equipped with load cells and/or strain gauges to determine the weight of asphalt mixture delivered.

3.12.1. Asphalt mixtures may be temporarily stored in properly sealed and insulated silos. Storage times shall not exceed the following:

- Eighteen (18) hours for Superpave mixtures,
- Three (3) hours for Stone Matrix Asphalt mixtures,
- Two (2) hours for Open-Graded mixtures.

3.13 Emission Controls: The plant shall follow the Alabama Department of Environmental Management (ADEM) and Section 107 regulations on emission controls.

3.14 Safety: The plant shall follow all safety regulations to ensure the well-being of all personnel working at the plant. Hard hat, steel toe boots, and safety glasses are required.

3.15 Plant Automatic Controls: All batching/blending, weighing, and mixing operations shall be fully automated.

3.16 Thermometric Equipment: Plants shall be equipped with recording thermometers to automatically record the temperature of the asphalt mixture at or near the discharge point. Thermometers shall be calibrated for the full range of production mixing temperatures and verified for accuracy periodically during production. Thermometers shall also be placed at or near the discharge chute of the drier (and in the hot fines bin for batch plants). A paperless recorder is acceptable as long as a printout can be made available on request. Data shall be stored electronically for at least two months. A paperless recorder is acceptable as long as a printout can be made available on request. Data shall be stored electronically for at least two months.

3.17 Recorders. The plant shall be equipped with digital recorders that will provide a permanent record of operations. The recorders shall indicate the following:

- Job-Mix Formula being produced,
- Weight of each material batched,
- Variations in batch quantities,
- Date and time of day,
- Mix temperature.

3.18 Additional Requirements for Batch Plants

3.18.1. Aggregate Bin Scales: Scales shall be provided for weighing each bin size of aggregate into a weigh box or hopper. If the scales are used for pay purposes, the scale tolerance shall not exceed 0.2% of the indicated weight when the scale is tested for accuracy.

3.18.2. Aggregate Storage: Storage bins shall be divided into partitions to store different aggregate sizes. Each partition shall have an overflow chute. Audible or visual alarms shall be provided to indicate when aggregate bins become empty.

- 3.18.3. Asphalt Binder Bucket: The asphalt binder bucket shall be capable of handling a full batch in a single weighing. The bucket filling system shall be of the proper design, size, and shape such that the asphalt binder will not overflow, splash or spill outside the bucket during filling and weighing. The bucket shall be steam-jacketed, oil-jacketed, or equipped with properly insulated electric heating units. The bucket shall be positioned so that it delivers the asphalt binder in a thin uniform sheet or in multiple sprays of the full length of the mixer.
- 3.18.4. Asphalt Scales: Ensure scales for the weighing of binder meet the requirement for aggregate scales, as specified in Article 3.18.1. Beam-type scales shall be equipped with a tare beam or adequate counterbalance for balancing the bucket and periodically compensate for the accumulation of asphalt binder on the bucket.
- 3.18.5. Mineral Filler and Fiber: Mineral filler and fiber shall utilize separate bins and feed systems to store and proportion the required quantity into the mixture. The feed systems shall be accurate to 10% of the required weight with a convenient and accurate means of calibration. Mineral filler and fiber shall be introduced in the weigh hopper and uniformly distributed prior to the injection of the asphalt binder.
- 3.18.6. Mixer Unit: Mixer shall be a twin pug mill-type mixer capable of mixing continuously for at least 45 seconds after all materials have been introduced into the mixer. The mixer shall provide means of adjusting the clearance between the mixer blades and liner plates to ensure proper and efficient mixing. The blades in the mixer shall be of sufficient number and size, capable of producing a homogenous mixture. If the mixer is not enclosed, it shall be equipped with an adjustable hood to prevent loss of dust by dispersion.
- 3.18.7. Mixing Period: The dry-mixing period is the interval of time prior to the application of asphalt binder. The wet-mixing period is the interval of time between the start of the application of the asphalt binder and the opening of the mixer gate. The timing control for dry- and wet-mixing shall be independently adjustable.

- 3.18.8. Automatic Batch Control: The plant shall be equipped with an automatic weighing, cycling, and monitoring system. The plant shall be equipped with audible or visual alarms to indicate an error in weighing, proportioning, empty aggregate bins, non-zeroed scales, or other alerts. The automatic proportioning system must be capable of uniformly delivering materials within the following tolerances:

Component	Total Batch Weight of Paving Mix
Batch aggregate	± 1.5%
Mineral Filler	± 0.5%
Hot-mix material	± 0.1%
Zero return Aggregate	± 0.5%
Zero return hot-mix material	± 0.1%

3.19 Additional Requirements for Continuous Plants

- 3.19.1. Interlocked feeders mounted under the bin compartments shall be equipped with a dust-proof revolution counter. When using mineral filler, a separate bin and feeder shall be provided, with its drive interlocked with the aggregate feeders.
- 3.19.2. The flow of aggregate shall be controlled by mechanical means. If a gate orifice-type feeder is used, at least one of its dimensions shall be adjustable by mechanical means. Gate openings shall be calibrated such that aggregate flow rates are within 1.0% of the actual weight.
- 3.19.3. Interlocking Control of Aggregates and Asphalt Mixer Unit: Interlocking controls shall synchronize the flow of aggregate and asphalt binder. Mixers shall be equipped with discharge hoppers and paddles to prevent segregation during the flow of the mix.
- 3.19.4. The scales shall be of sufficient capacity to accurately weigh the loaded trucks or tractor trailers that are used for delivery of asphalt paving mixtures from the plant.

3.20 Additional Requirements for Drum-Mix Plants

- 3.20.1. Aggregate Delivery System: The total cold aggregate shall be weighed continuously by an approved belt scale. The accuracy of the weighing system shall be within 1.0% of the actual weight
- 3.20.2. Aggregate Moisture Content: The moisture content shall be displayed on the control panel during start up and during production. The moisture content shall be correlated with moisture percentage as determined by ASTM C 70. The feed rate shall be re-established when changes in the moisture content are equal or greater than 1.0%.
- 3.20.3. Mineral Filler and Fiber: Mineral Filler and Fiber shall utilize separate bins and feed systems to store and proportion the required quantity into

the mixture. The feed systems shall be accurate to 10% of the required weight with a convenient and accurate means of calibration. Mineral filler and fiber shall be introduced such that dry mixing is accomplished no less than 18 inches prior to the injection of the asphalt binder.

- 3.20.4. Ensure the material does not become entrained in the exhaust stream of the dryer.
- 3.20.5. Asphalt Material System: Asphalt materials shall be introduced into the mix at a controlled rate of flow. The asphalt material flow system shall be interlocked with the aggregate weighing device. The interlock shall be capable of adjusting the flow of asphalt binder to compensate for any variation in the dry weight of aggregate flow
- 3.20.6. Drum-Mix Unit: The drum-mix unit shall be capable of drying and heating the aggregate to the moisture content required.
- 3.20.7. Asphalt Mixture Storage: The plant shall have a minimum of one surge bin or storage bin. The surge or storage bin shall be equipped with load cells and/or strain gauges to determine the amount of mix delivered from the plant.
- 3.20.8. Diversion System: The plant shall have means of diverting asphalt mixes out of the system at startups, shut downs, or as necessary.