



SAMPLING UNCOMPACTED HOT MIX ASPHALT

SCOPE

Two methods of sampling hot mix asphalt (HMA) are used for sampling mix to be submitted for laboratory tests. The necessary containers for Agency samples are available for purchase by the Contractor from the Iowa Department of Transportation Warehouse in Ames, Iowa.

REFERENCED DOCUMENTS

Standard Specification 2303 Hot Mix Asphalt Mixtures
Standard Specification 2309 Surface Recycling by Heater Scarification
IM 336 Reducing Aggregate Field Samples to Test Samples
IM 357 Preparation of Hot Mix Asphalt (HMA) Mix Samples for Test Specimens

APPARATUS

- Metal Sampling Template, with a minimum area of 64 in.² (410 cm²) & 4 in. (100 mm) deep.
- Laboratory Sampling Scoop (Square Pointed)
- Putty Knife
- 2-gallon (7.5-liter) capacity cardboard box (for Agency samples)
- Sampling Container
- Ruler
- Quartermaster (Optional)
- Square-pointed Shovel

Equipment used for sampling purposes must be clean and free of any materials, which may alter the material properties of the mixture. Extra care should be used when using petroleum distillates or other solvents to clean equipment. If petroleum distillates or other solvents are used to clean equipment, the equipment must be dry prior to use.

PROCEDURE

Sample Size

Samples submitted to both laboratories for testing shall be of sufficient size to run each of the required tests (a minimum of 30 pounds (14 kg) for each lab for G_{mm} and G_{mb} or 40 pounds (18 kg) for G_{mm} , G_{mb} and ignition oven). Samples taken from thick layers will be proportionately larger.

Sampling Methods

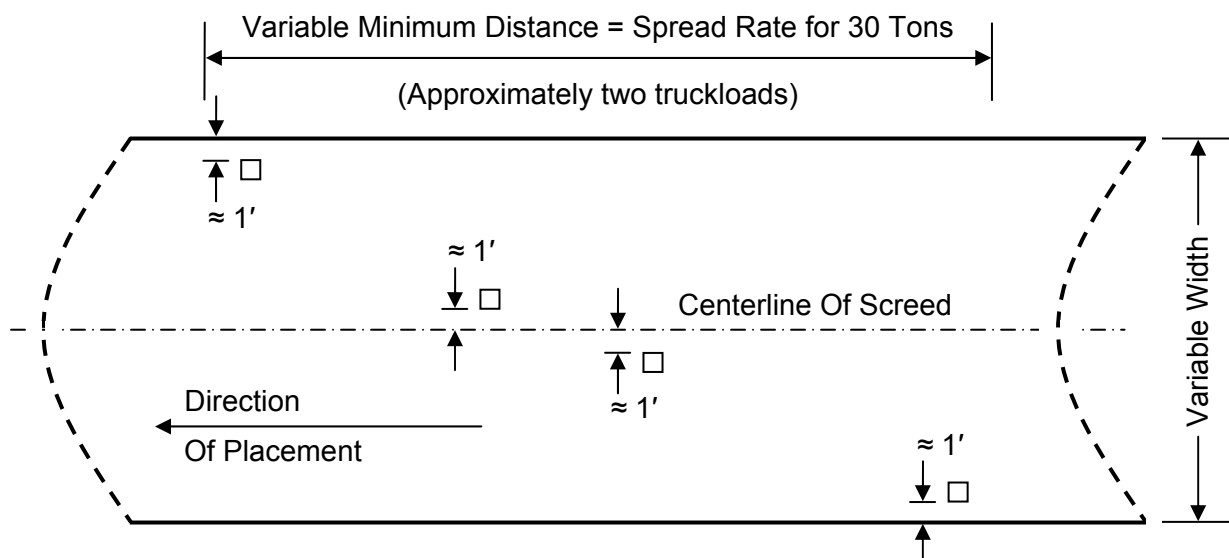
NOTE: Extreme care shall be taken to minimize segregation of coarse and fine particles while the sample is being taken. **NOTE:** Extreme care shall be taken so as not to contaminate the sample with any foreign matter (Fuel oil, dust, etc.).

A. Pavement Sampling

This method of sampling hot mix asphalt is not to be used in situations involving Heater Scarification Work as stated in Standard Specification 2309.

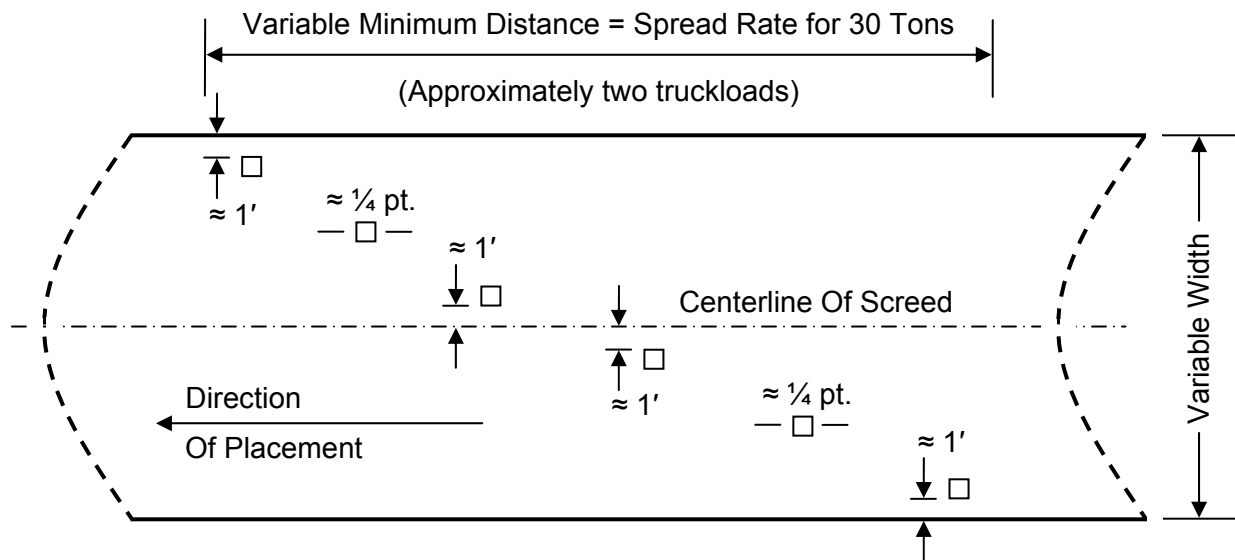
1. Samples shall always be taken behind the laydown machine before the material receives any compaction. Sampling shall be distributed over at least 30 tons (30 Mg) of mix placed (approximately two different truckloads).
2. The template shall be placed on the mat and forced straight down through the entire depth of the mat being laid. All material inside the template shall be scooped out and placed uniformly in the sample container(s). The scoop is used to remove the material from the inside of the template. All the material, which has stuck to both the inside and outside of the scoop, shall be scraped off and added to the sample. The engineer may adjust the details of this procedure when samples are obtained from courses placed on earth subgrades, untreated subbases and bases to prevent contamination. **NOTE:** Any material adhering to the inside of the template shall be scraped off and added to each template sample.
3. Samples shall be taken to represent a cross-section of the mat as follows:
 - a. A minimum of four template samples shall be taken. One approximately 1 foot (0.30 meters) in from the left edge of the mat, one approximately 1 foot (0.30 meters) left of the center of the screed, one approximately 1 foot (0.30 meters) right of the center of the screed, and one approximately 1 foot (0.30 meters) in from the right edge of the mat. (See Diagram 1.)

DIAGRAM 1



- b. If six template samples are needed to yield a sample of sufficient size, an additional template sample shall be taken approximately on each quarter point. (See Diagram 2.) If eight or more template samples are needed to yield a sample of sufficient size, two or more repetitions of four or six template samples may be required.

DIAGRAM 2



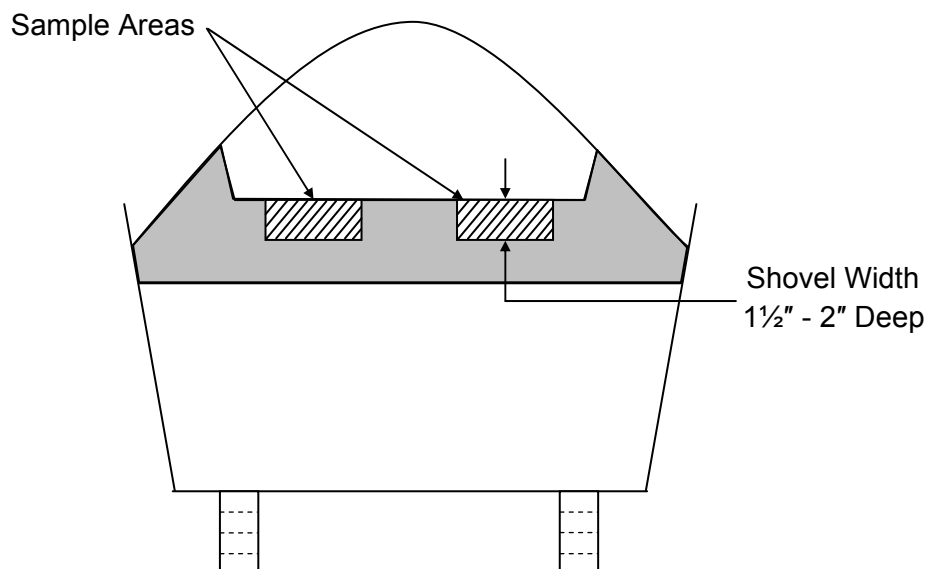
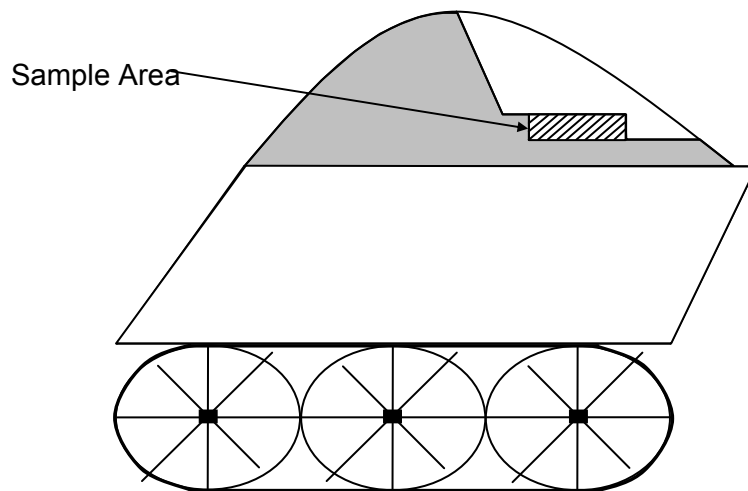
4. When sampling from thick lifts [generally greater than 3 inches (80 mm) in thickness], obtain the sample in increments as outlined above except a metal straight edge or a square point shovel may be used to delineate the sample sites in lieu of the template. When using the shovel to sample thick lifts, the shovel is first used to delineate the sample area and remove the material that is not part of the sample by creating a vertical face and pulling the shovel and excess material away from the sample area. Then the shovel can be used to remove the sample. The scoop can be used to finish the sampling to be sure that all mix within the delineated area is included in the sample increment. If the four segments required by 3a result in excess mixture, the additional mixture shall be forwarded to the appropriate laboratory. Large samples shall be carefully combined and reduced at the laboratory prior to testing.
5. When mix is placed in narrow widths such as base widening where the above sampling pattern will not work, a sample shall be obtained in a minimum of two increments from near the center of the placement and spread out over at least 30 tons or approximately two truckloads.

B. Hopper Sampling

This method of sampling hot mix asphalt shall be limited to projects using the Heater Scarification Process as stated in Standard Specification 2309.

1. The sample shall always be taken from the paver hopper.

2. A square pointed shovel shall be used to prepare the sampling area and to take the sample.
3. The sample shall be built up from a minimum of 30 tons (30 Mg) of mixture placed (approximately two different truckloads).
4. The sample shall be taken from a location, which is as near the center of the mass of a nearly full hopper as practically possible. A flat surface shall be prepared by removing mix downward from the peak until the desired plateau is reached. Just prior to taking the sample, all foreign material shall be scraped from the shovel. The sample shall be removed from the plateau in a manner that will assure collection of material over an area, which is of uniform dimension. In placing material into the box, the material from the front face of the shovel shall be included.



Paired Samples

Field Sampling (Side-by-Side Sampling) to obtain paired samples as required to provide Agency verification samples and Contractor quality control samples.

This method is only to be used when sampling directly from the pavement with a template.

1. The Contractor shall obtain HMA samples in accordance with the procedures outlined above, except that, two boxes of at least 30 pounds (14 kg) each (or 40 pounds (18 kg) each if ignition oven testing is required) shall be obtained from each samples site as directed and witnessed by the Engineer.
2. After obtaining each template sample for the first box, the template shall be moved longitudinally so that the second template sample site shares a common edge (not more than 4 inches apart) with the first. A double template with a divider in the middle may be used to expedite the paired sampling. When using a double template, scraping the material from the inside of the template needs to be done only once at the completion of sampling.
3. Perform the same procedures as stated above to remove all materials from the adjacent location and place this material in the second box.
4. Agency personnel will immediately take possession of one of the two boxes, secure it and fill out a sample identification (Form #193) before returning the sample to the Contractor for transport to the Agency's testing lab.

When paired samples are required, but a template is not used to delineate the sample such as for base widening, thick lifts or heater scarification, the Engineer will provide direction on the sampling procedures to be used. Adjacent locations for paired samples will be used whenever practical.

Sample Splitting

These splitting methods are to be used for reducing large field samples to lab sample size and to provide split samples for testing in multiple labs. To reduce samples to test sample size see IM 357.

The order of preference of sample splitting is as follows:

A. Quartermaster (Or Similar Quartering Device)

1. Place the entire sample in the Quartermaster. **NOTE:** Take care to avoid segregation when placing material in the Quartermaster.

2. Release the gate to split the sample into four smaller samples.
3. Take the split material from opposite corners and recombine to obtain two boxes of material.

B. Riffle Splitter

Follow procedure I, Splitting Method, in IM 336 with the following exceptions:

1. Only one cycle of this process is performed to obtain the desired sample size for both labs.

C. Manual Splitting

Follow procedure IV, Quartering Method, in IM 336 with the following exceptions:

1. Only one cycle of this process is performed to obtain the desired sample size for both labs.

Sample Delivery & Retention

1. Each sample shall be carefully labeled by the Agency Inspector.
2. The Contractor will transport the boxes to the Contractor's QMA laboratory.
3. The Contractor's certified technician will test the unsecured box of the paired sample at the Contractor's QMA laboratory for testing.
4. The secured box of each paired sample will be retained at the Contractor's QMA laboratory until delivered by the Contractor to the testing lab designated by the Engineer.
5. The Contractor shall retain all samples and test specimens for a lot until the Contracting Authority accepts the lot. **NOTE:** The Contractor should retain all samples until notified by the Contracting Authority that the material is no longer required.