MICHIGAN TEST METHOD
FOR
STANDARD PRACTICE OF SAMPLING
HMA PAVING MIXTURES

1. Scope

8 This practice covers sampling of HMA paving mixtures at points of manufacture, storage, or delivery.

1.2 The values stated in acceptable metric units are to be regarded as the standard. The values in parentheses are provided for information purposes only.

2. Referenced Documents

2.1 ASTM Standards:

C 702	Practice for Reducing Field Samples of Aggregate to Testing Size[2]
D 979	Standard Practice for Sampling HMA Paving Mixtures[5]
D 2234	Test Method for Collection of a Gross Sample of Coal[3]
D 3665	Practice for Random Sampling of Construction Materials[5]
E 105	Practice for Probability Sampling of Materials[4]
E 122	Practice for Choice of Sample Size to Estimate the Average Quality of a Lot of Process[4]
E 141	Practice for Acceptance of Evidence Based on the Results of Probability Sampling[4]

3. Significance and Use

3.1 General:

3.1.1 Sampling is equally as important as the testing, and the sampler shall take every precaution to obtain samples that will yield an acceptable estimate of the nature and conditions of the materials that they represent.

3.1.2 Samples for the development of preliminary data are obtained by the party responsible for the development of the data. Samples for control of the product at the source of manufacture or storage, or at the site of use, are obtained by the manufacturer, Contractor, or other parties responsible for accomplishing the work. Samples for tests to be used in acceptance or rejection decisions by the purchaser are obtained by the purchaser or his authorized representative.

4. Procedure

4.1 Inspection - The material shall be inspected to determine discernible variations. The seller shall provide equipment needed for safe and appropriate inspection and sampling.

4.2 Sampling - The procedures for selecting locations or times for sampling are described in Practice D 3665.

4.2.1 *Sampling from a Conveyor Belt* - Stop the conveyor belt. Randomly select at least three areas of approximately equal size on the belt for sampling. In each of the locations to be sampled, insert templates, the shape which conforms to the shape of the belt. From the selected areas obtain approximately equal increments of material which will form a sample whose quantity equals or exceeds the minimum recommended in 4.3.2. Carefully scoop all material between templates into a suitable container.

4.2.2 *Sampling from Truck Transports or Paver Hoppers* - By a random method, select the units to be sampled from the production of materials delivered. Obtain at least three approximately equal increments. Select at random from the unit being sampled and combine to form a field sample whose quantity equals or exceeds the minimum recommended in 4.3.2. The sample may be obtained by collecting the increments with a scoop or shovel.

4.2.3 *Sampling from the Roadway Prior to Compaction* - When only one sample is to be taken, obtain at least three approximately equal increments, selected at random from the unit being sampled, and combine to form a field sample whose quantity equals or exceeds the minimum recommended in 4.3.2.

4.2.3.1 When three or more samples are to be taken in order to evaluate a lot of material, utilize a random method to locate the locations to be sampled. Select a sample from each location, assuring the quantity of each sample exceeds the minimum recommended in 4.3.2.

4.2.3.2 Take all increments or samples from the roadway for the full depth of the material, taking care to exclude any underlying material. When necessary, place templates on the existing roadway to exclude any underlying material. Clearly mark the specified area from which each increment or sample is to be removed. Templates which are placed before the mixture is spread will be a definite aid in securing approximately equal increment weights.

4.2.4 *Sampling from a Skip Conveyor Delivering Mixture to Bin Storage* - Select the units to be sampled from the skip conveyor by a random method based on the bin's storage capacity. Stop the skip conveyor immediately following pug mill discharge. Dig a furrow 6 in. (150 mm) in depth extending from the top to the bottom of the pile. Obtain three approximately equal increments from the top, middle, and bottom of the furrow depositing each portion in a container. The combined portions should form a field sample whose quantity equals or exceeds the minimum recommended in 4.3.2.

4.2.5 *Sampling from a Funnel Device Feeding a Conveyor for Mixture Delivery to Storage* - Select the units to be sampled from the funnel device by a random method based on the bin's maximum storage capacity. Obtain at least three approximately equal increments of material for each sample by passing a bucket or pan or other suitable container across the full flow of materials as it drops from the funnel device onto the conveyor. The combined portions should form a field sample whose quantity equals or exceeds the minimum recommended in 4.3.2.

4.2.6 *Sampling from Roadway after Compaction* - Select the units to be sampled by a random method from the material in place. Obtain at least three approximately equal increments selected at random from the unit being sampled. Test each increment and average the test results to determine the acceptability. Take all increments from the roadway for the full depth of the material, taking care to exclude any underlying material. Each increment shall be obtained by coring, sawing, or other methods in such a manner as to ensure a minimum disturbance of the material.

4.2.7 *Sampling HMA Loose Mix from Wedging* – Stick the mat to find the width that meets the minimum thickness required for coring. The width subject to loose mix sampling and coring will need to meet the minimum thickness required for coring for the particular nominal max aggregate size in the mix. If this width is less then 3 feet use a mini-stockpile for sampling.

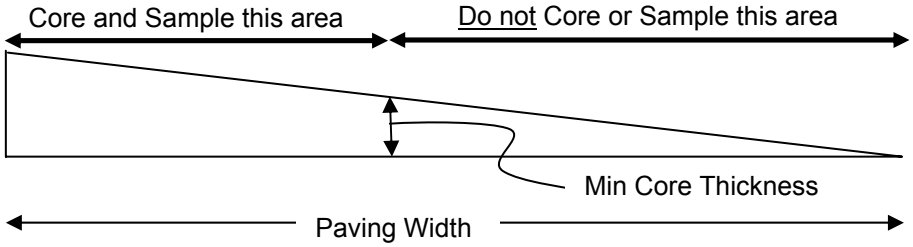

Figure 2: Sampling from Wedging; only sample from pavement area that meets minimum core thickness.

4.2.8 *Sampling HMA Loose Mix from Mini-Stockpile* - Select the tonnage to be sampled by a random method. Have the Contractor form a mini-stockpile (approximately 3 to 5 tons). For one composite sample, take at least four approximately equal increments of material from around the stockpile (front, back, right, and left) and at different heights. At each location around the stockpile, obtain an increment of the sample by digging into the pile approximately one foot, forming a vertical face to remove the segregated material. The shovel is then brought up the entire vertical face to obtain the sample; this material will be placed in a bucket with all other

increments sampled from that stockpile to form one composite sample.

4.3 Number and Quantities of Field Samples:

4.3.1 The number of field samples (obtained by one of the methods described in 4.2) required depends on the criticality of, and variation in, the properties to be measured. Designate each unit from which a field sample is to be obtained prior to sampling. The number of field samples from the production should be sufficient to give the desired confidence in test results.

NOTE 1- Guidance for determining the number of samples required to obtain the desired level of confidence in test results may be found in Method D 2234, Practice E 105, Practice E 122, and Practice E 141.

4.3.2 A guide to the quantity of material in field samples is given in Table 1. The quantities depend on the type and number of tests to which the material is to be subjected, and sufficient material must be obtained to provide for the proper execution of these tests. Standard control and acceptance tests are covered by ASTM Standards and specify the portion of the field sample required for each specific test.

TABLE 1
Guide for Estimating Quantity of Sample

Maximum Nominal Size, of Aggregates[A]	Approximate Weight of Uncompacted Mixture, min, lb (kg)	Approximate Area of Compacted Mixture, min, in^2 (cm^2)
No. 8 (2.36-mm)	4 (1.8)	36 (232)
No. 4 (4.75-mm)	4 (1.8)	36 (232)
3/8" (9.5-mm)	8 (3.6)	36 (232)
2" (12.5-mm)	12 (5.4)	64 (413)
3/4" (19.0-mm)	16 (7.3)	100 (645)
1" (25.0-mm)	20 (9.1)	144 (929)
1-1/2" (38.1-mm)	25 (11.3)	144 (929)
2" (50-mm)	35 (15.9)	225 (1453)

[A]The nominal maximum size of aggregate is the largest sieve size listed in the applicable specification upon which any material is permitted to be retained.

Generally, the amounts specified in Table 1 will provide adequate material for routine testing. Extract test portions from the field sample by quartering or splitting in a similar manner to Practice C702 or as required by other applicable test methods.

NOTE 2 - The approximate areas of a sample for a given weight are given in Table 1. These dimensions are based on normal lay down thicknesses for each aggregate size. Differences in thickness, specific gravity of the aggregate and mix design will cause some variance in these areas.

5. Shipping Samples

5.1 Transport samples in containers so constructed as to preclude loss or contamination of any part of the sample, or damage to the contents from mishandling during shipment.

5.2 Samples shall have individual identification attached giving the information required by the sample user. Typical information that may be useful could include, but not necessarily be limited to, the following:

5.2.1 Job for which the material is to be used, giving project number, highway route number, county, and other pertinent geographical information.

5.2.2 Source of sample, including for plant-mixed samples the name of owner or operator of plant, location of plant, type of plant, size of batch, and identification of bitumen and mineral aggregates used in the mixture.

5.2.3 Point at which sampled, for samples taken from roadway, both by station number and location transversely in pavement; also whether sampled from completed pavement windrow, etc.

5.2.4 Quantity represented.

5.2.5 By whom sampled and title.

5.2.6 Date of most recent mixing, if road-mixed.

5.2.7 Date sampled.

5.2.8 By whom submitted and address.

5.2.9 Purpose for which sample was taken.

5.2.10 To whom report is to be made.

APPENDIX

(Non-mandatory Information)

NUMBER AND SIZE OF INCREMENTS NEEDED TO ESTIMATE CHARACTER OF UNIT SAMPLED

X. Scope

X1. This appendix presents the rationale used by the responsible committee in the development of this Practice.

X2. Descriptions of Terms Specific to This Standard

X2.1 Field sample - a quantity of the material to be tested of sufficient size to provide an acceptable estimate of the average quality of a unit.

X2.2 Lot - a sizable isolated quantity of bulk material from a single source, assumed to have been produced by the same process (for example, a day's production or a specific mass or volume).

X2.3 Test portion - a quantity of the material of sufficient size extracted from the larger field sample by a procedure designed to ensure accurate representation of the field sample, and thus of the unit sampled.

X2.4 Unit - a batch of finite subdivision of a lot of bulk material (for example, a truckload or a specific area covered).

X3. Test Unit, Size, and Variability

X3.1 The unit to be represented by a single field sample should not be so large as to mask the effects of significant variability within the unit. Neither should a unit be so small as to be affected by the inherent variability between small portions of any bulk material.

X3.2 A unit of bulk material composed of graded aggregate or aggregate mixtures might consist of a full truckload. If it were possible, the entire load might be tested; as a practical matter, a field sample is composed of three or more increments chosen at random from the material, as it is loaded or unloaded from the truck. Research has shown that such a procedure permits an acceptable estimate to be made of the average gradation that might be measured from 15 or 20 increments from the truck.

X3.3 Significant variability with a lot of material, where it might exist, should be indicated by statistical measures, such as the standard deviation between units selected at random from within the lot.

[2]Annual book of ASTM Standards, Vol 04.02.
[3]Annual book of ASTM Standards, Vol 05.05.
[4]Annual book of ASTM Standards, Vol 14.02.
[5]Annual book of ASTM Standards, Vol 04.03.