

Standard Method of Test for

# **Sampling, Testing, and Accepting Asphalt Plant Silos for Extended Storage of Asphalt Mixtures**

SCDOT Designation: SC-T-79 (04/2022)

## **1. SCOPE**

- 1.1. This test method covers sampling and testing of silos used for extended storage time (up to 18 hours maximum) of asphalt mixtures.

## **2. REFERENCED DOCUMENTS**

- 2.1. AASHTO T 315.
- 2.2. SC-T-62, SC-T-75, SC-T-95, SC-T-101, SCDOT Form 400.08.

## **3. SIGNIFICANCE AND USE**

- 3.1. The purpose of this procedure is to ensure that an asphalt storage silo is insulated, and is heating and sealed properly to prevent overheating the material and to prevent air from entering into the silo, all of which oxidizes or stiffens the asphalt mixture during an extended time of storage.

## **4. APPARATUS**

- 4.1. Round pointed shovel, cloth sample bags, and 3 tamper resistant tags (Securneck 1NH or similar).

## **5. TEST SPECIMEN**

- 5.1. Three bagged and sealed samples of asphalt mix obtained by the asphalt contractor from the test silo according to SC-T-62. The sample bags of asphalt mixture should weigh between 10 - 20 lbs. each.

## **6. PROCEDURE**

- 6.1. The contractor will contact the District Asphalt Manager (DAM) to make arrangements for scheduling the witnessing of the silo discharge. The DAM will coordinate with the Asphalt Testing Supervisor at the Office of Materials and Research (OMR).
- 6.2. The contractor will fill the asphalt storage silo with an approved SCDOT mix containing no more than 25% aged (recycled) binder at least 12 hours prior to sampling. Mixes containing RAS will not be permitted for this procedure. Mixes that do not contain recycled asphalt pavement (RAP) are preferred due to the possibility of contamination, but are not required. The mixture used for this test can be used on SCDOT projects and is subject to random sampling in accordance with SC-T-101 for that production day.

- 6.3. Production printouts must be retained and supplied with the samples to show the SCDOT inspector (usually the DAM or their assistant) the next day when the silos were filled for this test. The asphalt plant will not be allowed to add any additional material to the silo until all of the asphalt mixture is discharged and sampled the next day. The next day, three (3) samples shall be taken by the asphalt contractor's plant technician and observed by a SCDOT Asphalt Level I or higher technician (DAM or their assistant) and obtained as follows:
  - 6.3.1. Sample No.1 will be obtained in accordance with SC-T-62 from the first full truckload discharged from the silo. The temperature of the mix and the time of discharge will be recorded on Form 400.08. The hot asphalt mix is placed into a cloth sample bag. The SCDOT inspector will attach a security seal around the opening of the filled sample bag, ensuring the bag is closed properly, and the sample bag marked as Sample No. 1 (bottom), along with any other pertinent sample identification.
  - 6.3.2. Sample No. 2 will be obtained in accordance with SC-T-62 from the truck when the silo is approximately half empty. The temperature of the mix and the time of discharge will be recorded on Form 400.08. The hot asphalt mix is placed into a cloth sample bag. The SCDOT inspector will attach a security seal around the opening of the filled sample bag, ensuring the bag is closed properly, and the sample bag marked as Sample No. 2 (middle), along with any other pertinent sample identification.
  - 6.3.3. Sample No. 3 will be obtained in accordance with SC-T-62 from the truck when the last full load is discharged from the silo. The temperature of the mix and the time of discharge will be recorded on Form 400.08. The hot asphalt mix is placed into a cloth sample bag. The SCDOT inspector will attach a security seal around the opening of the filled sample bag, ensuring the bag is closed properly, and the sample bag marked as Sample No. 3 (top), along with any other pertinent sample identification.
- 6.4. Samples must be delivered to SCDOT OMR Receiving located at 1406 Shop Road, Columbia, SC 29201 by the contractor or SCDOT inspector who witnessed the silo discharge and sampling within three (3) calendar days of sampling. Samples delivered outside the hours of 8:00 AM to 4:15 PM EST will not be accepted by SCDOT.
- 6.5. All mixture information must be completed on SCDOT Form 400.08 by the SCDOT inspector on site, regardless of whether the mix is being sent to a SCDOT project or not. Samples taken from SCDOT projects must be entered by the DAM's office into SiteManager with a 900 sample ID number, and entered as "For Information Only" instead of "Job Control". All other samples not taken on SCDOT projects will be logged into SiteManager by SCDOT OMR asphalt staff and given an 800 sample ID number.
- 6.6. The asphalt mix samples are reheated and tested in the order in which they are received. The asphalt binder from each of the HMA samples will be extracted and recovered according to SC-T-95. The samples will be tested for asphalt binder content according to SC-T-75 via ignition oven and for stiffness via DSR according to AASHTO T 315. The DSR testing temperature will be based on the percentage of RAP used in the Job Mix

Formula. For mixes containing 15% or less aged binder, the test will be performed at 64°C. For mixes containing 16 - 25% aged binder, the test will be performed at 76 °C.

## **7. REPORT**

- 7.1. The samples will be analyzed by using their average and the standard deviation of the three (3) DSR test results for recovered stiffness. The asphalt binder content will be checked against the job mix formulation (JMF) for job mix compliance. Any DSR test result found outside the +/-1.5 standard deviation of the computed average will be considered an outlier sample, and the storage silo will be rejected due to inconsistent stiffness values. In the event that the samples do not meet this requirement, the contractor will be contacted and instructed to investigate the reason for root cause of the inconsistent results. If the samples fail to meet job mix criteria for asphalt content, the silo will also be rejected. If the samples are within the set guidelines above, an acceptance letter will be generated by the Asphalt Materials Manager showing that the storage silo meets SCDOT requirements.
- 7.2. The accepted silo is approved for two (2) years before having to be tested for conformance again.
- 7.3. Sample information will be recorded on SCDOT Form 400.08 – Extended Silo Storage. The sample results are to be reported on SCDOT Form MD419.

## SILO APPROVAL OVERNIGHT STORAGE

Contractor: \_\_\_\_\_ Plant location: \_\_\_\_\_

Sampled By: \_\_\_\_\_ Production Printouts Required for Submittal:

Type Mix: \_\_\_\_\_ PIN: \_\_\_\_\_

File Number: \_\_\_\_\_ Job Mix Number: \_\_\_\_\_

Date of Charging Silo: \_\_\_\_\_ Date of Discharging Silo: \_\_\_\_\_

**NOTE: This procedure must be coordinated with a SCDOT District Asphalt Manager (DAM) to review plant production reports verifying when the silo was filled and witness sampling by the contractor. Samples that are not submitted to OMR Columbia for testing within 3 calendar days of sampling may not be accepted.**

Silo # Being Tested: \_\_\_\_\_

Tag ID of Bottom Sample No 1: \_\_\_\_\_

Tag ID of Middle Sample No 2: \_\_\_\_\_

Tag ID of Top Sample No 3: \_\_\_\_\_

### Time AND Temperature

Ending time of production the day prior to sampling: \_\_\_\_\_

Time AND temperature of first full load and sample taken: \_\_\_\_\_ / \_\_\_\_\_

Time AND temperature of middle load (2<sup>nd</sup> sample) taken: \_\_\_\_\_ / \_\_\_\_\_

Time AND temperature of last load (3<sup>rd</sup> sample) taken: \_\_\_\_\_ / \_\_\_\_\_

SCDOT REPRESENTATIVE SIGNATURE AND DATE IS REQUIRED.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_