Standard Method of Test for

Preparation, Verification, and Acceptance of Asphalt Mix Formulas

SCDOT Designation: SC-T-80 (rev. 06/2021)

1. SCOPE

1.1 This method outlines the procedure for submitting asphalt job mix formulas for mixtures found in SC-M-402 to the SCDOT Office of Materials and Research for preparation, verification and acceptance.

2. REFERENCE DOCUMENTS

2.1 SC Test Procedures: T-68, T-70, T-75, T-83, T-88, T-96, T-102, T-103
2.2 SC Specifications: M-402 and M-405, M-407
2.3 SC Forms: Lab Form 269 and SCDOT Mix Design Workbook Forms.

3. SUMMARY OF TEST METHOD

3.1 The test method describes the process of submitting asphalt mix formulas once the asphalt contractor has performed various tests on the mixture, and the Department's results are compared with the contractor's results. The results are checked against the contract specifications for asphalt mix formulas, and asphalt mixes are accepted when all of the mix criteria or specifications are followed according to the SCDOT.
Note: **OGFC designs will follow SC-T-88 exclusively.**

4. SIGNIFICANCE AND USE

4.1 Asphalt mixes are verified and accepted by the SCDOT to ensure that they meet all requirements set forth by the department. The significance of this procedure is to describe what steps are required for submitting asphalt job mix formulas for SCDOT acceptance.

5. APPARATUS

5.1 Refer to reference documents for a listing of equipment needed to complete a Job Mix Formula (JMF).

6. ASPHALT JOB MIX FORMULA EXPIRATION

6.1 Initial job mix formulas are valid for two years with a maximum of three revisions. If additional revisions are required after the allowable three have been made, a new job mix formula is required.

6.2 A job mix formula may be extended for two additional years. For a job mix formula to be extended, the data outlined in Section 7.2 must be submitted at least 14 calendar days prior to the mix expiration date. If the renewal data is not submitted by this deadline, a new job mix formula will be required.

7. TEST SPECIMEN - SUBMITTALS

7.1 **New Job Mix Formula Submittal**

The asphalt contractor's SCDOT certified Level II Asphalt Technician must submit the following items for verification of each job mix formula along with the appropriate forms (located in the SCDOT Mix Design Workbook) and copies of all gyratory printouts and stability graphs used for the design. These forms include Form 269, batch weighing sheets, moisture susceptibility, computation worksheet, volumetric worksheet, and performance test worksheets (prepared APA and Ideal cracking specimens if required). All testing must be performed in an SCDOT certified Asphalt Job Mix Preparation Laboratory in accordance with SC-M-405.

7.1.1 Three gyratory specimens (110-120mm), prepared at optimum binder content (e.g. – optimum is set at 4.8%, submit specimens at 4.8%.) The specimens must be different specimens made after optimum is determined for the formula (90-100mm specimens required for Surface E, PMTLSC, and asphalt base C &D used to verify stability).
Note: Not required for OGFC (see SC-T-88), SWC and asphalt base A & B mixes.

7.1.2 One Maximum Theoretical Specific Gravity sample. Prepared at optimum binder content and made at batch weight according to nominal maximum aggregate size.
Note: Not required for OGFC (see SC-T-88), Surface E, SWC, PMTLSC, and all asphalt base mixes.

7.1.3 Three blended aggregate samples at batch weight for check samples. One additional check sample of blended aggregate at desired batch weight for MSG (if required) according to nominal maximum aggregate size.

7.1.4 Six gyratory specimens gyrated to a height of 75 +/- 1 mm, with 4.0 +/- 1.0% air voids. These specimens are to be used for APA rutting testing performed by the SCDOT.
Required for Intermediate Type A and B (and B Special), Surface Type A and B and any SMA mixtures.

7.1.5 Three gyratory specimens gyrated to a height of 62 +/- 1 mm. with 7 +/- 0.5 air voids. These specimens are to be used for Ideal cracking testing performed by the SCDOT.
Required for Intermediate Type A and B (and B Special), Surface Type A and B and any SMA mixtures. Any Surface C, D and E and Intermediate C mixes will also be accepted, but not required at this time.

7.1.6 RAP/RAS – Mixtures containing RAP or RAS must have individual samples of weighed recycled material, same as the submitted weigh-up worksheets.

7.2 **Job Mix Formula Extension**

The asphalt contractor's SCDOT certified Level II Asphalt Technician must submit the following items for verification of the existing job mix formula.

7.2.1 For mixes having at least 10 SCDOT QA results within the past 24 months:

7.2.1.1 Submit the 10 most recent SCDOT QA worksheets showing all volumetric and gradation results, and confirm that the mix is performing as designed.

7.2.1.2 For RAP and RAS mixes, submit the 10 most recent RAP/RAS stockpile sample results including average gradation and binder content.

7.2.2 For mixes with fewer than 10 SCDOT QA results within the past six months:

7.2.2.1 Submit three gyratory samples and two MSG samples made with job mix formula gradation and at optimum binder content as well as the contractor's test result data from these samples to confirm mix properties are still consistent and valid.

7.2.2.2 For RAP and RAS mixes, submit the 10 most recent RAP/RAS stockpile sample results including average gradation and binder content.

8. PROCEDURE – SCDOT VERIFICATION

8.1 Determine the Bulk Specific Gravities (BSG) of the gyratory specimens using SC-T-68. The Department's average BSG of each set of specimens must compare within 0.020 of the contractor's BSG. The individual specimens submitted must also be within 0.020 of the average contractor's BSG value.

8.2 Perform SC-T-83 to calculate the Maximum Theoretical Specific Gravity (MSG), and the Effective Specific Gravity (ESG). The Department's test results must compare with the contractor's ESG within 0.018.

8.3 If either sets of gyratory cores, or the ESG, do not compare, then the Department will use the blended aggregate samples to check specimens. If the specimens still do not compare to the contractor's tests, the contractor will be required to redesign the mix, or perform additional testing as requested by the SCDOT. If the check specimen compares to the contractor's original specimen, then the original data will be used.

8.4 Moisture susceptibility (SC-T-70), stability (SC-T-96) and other test reports will be reviewed and may be required to be verified.

8.5 APA tests will be performed on 75 mm gyratory specimens to check for rutting resistance.

8.6 Ideal cracking tests will be performed on the 62 mm gyratory specimens to collect data for establishing future specifications for minimum cracking index values.

8.7 Dynamic Modulus and additional cracking tests may be performed on mix designs on a random basis to collect data for future pavement design input.

8.8 Mix extension verification sample data will be compared to the current job mix formula. In the event that SCDOT results do not compare as stated in this procedure or fail to meet contract specifications (SC-M-402, SC-M-407), the mix extension will not be granted, and a new job mix formula will be required. Additional checks may be performed on submitted samples to verify the gradation (SC-T-102) and binder content (SC-T-75) is within acceptance tolerance for the mix type with the contractor's mix correction factors applied.

9. CALCULATIONS

9.1 As per SC-T-68, SC-T-70, SC-T-75, SC-T-83, SC-T-96, SC-T-102, SC-T-103.

10. REPORT

10.1 The Department will prepare a job mix formula information sheet with the contractor's name, plant location, testing data, along with acceptance and expiration date. The Department will revise job mix formulas that are extended to show original approval, original expiration, and final extension dates. This information sheet will be kept on file at the Department and a copy will be sent to the contractor.