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**Tennessee Department of Transportation**
**Division of Materials and Tests**

# Submittal and Approval of Hot Mix Asphalt Mix Designs (SOP 3-4)

Purpose: The purpose of this document is to establish an acceptance procedure for hot mix asphalt mix designs.

Discussion: Asphalt mix designs submitted to the TDOT must exhibit certain physical performance properties indicated in Standard Specifications including but not limited to Marshall Stability, flow, and Tensile Strength Ratio (TSR). In addition, designs must exhibit a capability of producing other physical properties consistent with that which is reported on Job Mix Formulas (JMF), such as Bulk Specific Gravity (Gmb), Maximum Theoretical Specific Gravity (Gmm), and aggregate loss on ignition.

Procedure: A new Asphalt Mix design shall be subject to the following procedure prior to being approved for use in TDOT work:

*Step 1:* The contractor/designer, after conducting an asphalt mix design in accordance with TDOT Mix Design procedures outline in Section 407 of TDOT Standard Specifications, shall complete all necessary fields in the most current version of the TDOT Asphalt Mix Design workbook. The contractor will provide the results of an original DSR with the mix design submitted showing that the anti-strip additive has not degraded the binder grade. (See Example Letter on last page)

*Step 2:* No less than 14 working days prior to mix production, the contractor/designer shall submit materials to the regional TDOT laboratory according to Table 1*, along with a completed copy of the latest available electronic TDOT JMF software. Designs must be submitted no less than 14 working days prior to mix production.

**Table 1**

| MIX TYPE | HMA SAMPLE REQUIREMENTS |
|---|---|
| 307 BM | 3 Pills compacted at design air voids |
| 307 BM-2 | 6 Pills compacted at 7±1% Air Voids |
| 307 C | 2 Samples for Rice Gravity** |
| 307 CS | LOI (411 D Only) |
| 307 CW | 2 Samples for NCAT Furnace |
| 411 D | Calibration*** |
| 411 E Roadway | |
| 411 E Shoulder | |
| 411TL | |
| 411TLD | |
| | |

**Table 1 (Continued)**

| MIX TYPE | HMA SAMPLE REQUIREMENTS |
|---|---|
| 411 OGFC | 9 Pills at optimum AC (50-blow |
| | Marshall or 50-gyration gyratory) |
| | 2 Samples for Rice Gravity** |
| | 2 Samples for NCAT Furnace |
| | Calibration*** |
| | 5000-g aggregate batch for dry- |
| | rodded unit weight |
| | LOI |
| | |
| 307 A | None |
| 307 AS | |
| 307 ACRL | |
| 313 TPB | |
| | |
| Same As w/: | None |
| No changes | |
| AC Supplier Change | |
| Binder Upgrade | |
| | |
| Same As w/: | 6 Pills compacted at 7±1% Air Voids |
| Binder Downgrade | 2 Samples for Rice Gravity** |
| | |

* Unless directed otherwise by the Regional Materials Supervisor

** Samples should be sized according to Section 7 of AASHTO T 209

*** Samples should be sized according to Table 1 of AASHTO T 308

*Step 3:* Pending test results and JMF review; the regional laboratory will either reject the design, or submit it to the Regional Materials supervisor for approval. If a design is rejected, the design technician or contractor will be notified via email or by phone by Regional Materials and Tests.

*Step 4:* Once approved, mix designs will be valid for TDOT work until December 31st.

*Step 5:* Following the approval of a mix design, the contractor must submit a completed copy of the TDOT form, *Contractor Request for Contract/ Mix Design Association*. This will ensure TDOT inspectors in the field are able to view approved mix designs in SiteManager to properly create samples and perform tests for acceptance.

*Step 6:* Once production begins, split samples for verification should be submitted to the regional laboratory according to Parts 2 and 3 of SOP 1-1.

Example AC/ASA Compatibility Letter

MEMORADUM

To: Contractor _____

From: Antistrip Additive or Asphalt Cement Supplier _____

Date: _____

This letter is to serve as the manufacturer's documentation of asphalt cement (binder) and anti-strip additive (ASA) compatibility required per Tennessee Department of Transportation Specification 407.02 which states: "Manufacturer's documentation that asphalt binders will continue to meet requirements listed in subsection 904 after anti-stripping additive is added shall be provided by the contractor with the mix design submittal."

The department has chosen to accept the results of an original DSR of the binder and anti-strip additive combination as the basis of this acceptance at this time. We have tested the performance of _____ PG-XX-YY asphalt binder containing (Amount on JMF)% of _____ anti-strip additive (lab results attached). Based on this result; the binder/ASA combination proposed on the Job Mix Formula (Does/Does Not) meet TDOT's specification for Original DSR.

| **Asphalt Grade** | **Anti-Strip Additive** | **ASA Dosage Rate** | **Original DSR After ASA** |
|---|---|---|---|
| | | | |

Note that TDOT will only accept mixes with a combination of asphalt cement and anti-strip additive that has been demonstrated to meet specification after blending. Combinations that have been determined to not meet due to incompatibility will not be accepted for use in TDOT mixes. Any binder and anti-strip additive combinations that have not been tested and will require passing Original DSR results of the binder containing the job mix formula dosage rate of anti-strip additive prior to approval by the department.