

**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, Marshall 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 (LOI).
- 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.

If submitting a design using fractionated RAP at the maximum design limits, as specified by Section 307 and 411 of the Standard Specifications, submit the previous 5 Quality Control results of the fractionated RAP stockpiles with the JMF. The QC results must show the RAP has remained consistent and the asphalt cement content has not varied by more than 0.5%.

TABLE 1

Mix Type	HMA Sample Requirements
307 B 307 BM 307 BM-2 307 C 307 CS 307 CW 411 D 411 E 411 TL 411 TLD 411 TLE	3 Pills compacted at design VTM 6 Pills compacted at $\pm 7\%$ VTM**** 2 Samples for Rice Gravity** LOI (Surface Mixes Only) 2 Samples for Ignition Oven Correction Factor***
411 OGFC	9 Pills at optimum AC compacted per 407.03.C 2 Samples for Rice Gravity** 2 Samples for Ignition Oven Correction Factor*** 5000 g aggregate batch for dry rodded unit weight LOI
307 A 307 AS 307 ACRL 313 ATPB 411 E Shoulders 411 TLE Shoulders	None
Same as designs w/ -AC Supplier Change -Anti-Strip/ Warm mix Additive Change -Binder Downgrade	6 Pills compacted at $\pm 7\%$ VTM 2 Samples for Rice Gravity**
Same as designs w/ -No changes -Binder Upgrade (same supplier)	None

* Unless otherwise directed by Regional Materials Engineer

** Samples sized according to Section 7 of AASHTO T209

*** Samples sized according to Table 1 of AASHTO T308

**** 9 pills compacted at 7% VTM for 411-D

Step 3: Pending test results and JMF review; the regional laboratory will either reject the design, or submit it to the Regional Materials Team Lead for

approval. If a design is rejected, the design technician or contractor will be notified via email or by phone by 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.

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.