

QPL 14: ANTI-STRIPPING ADDITIVES

SECTION A. LIQUID ADDITIVES

GENERAL

This evaluation procedure outlines the Department's approval process for liquid anti-stripping additives used to prevent stripping of asphalt cement from aggregates in asphalt mixes.

SPECIFICATIONS

- TDOT Standard Specification 307.03C – Bituminous Plant Mix Base (Hot Mix), Materials, Anti-Strip Additive
- TDOT Standard Specification 407.03E.2 – Bituminous Plant Mix Pavements (General), Composition of Mixture, Testing Procedures, Ten Minute Boil Test (Stripping)
- TDOT Standard Specification 921.06B.1 – Anti-Stripping Additives
- NTPEP Review – <http://www.ntpep.org/Pages/WarmMixAsphaltTechnologies.aspx>

PROCEDURES

A completed Product Evaluation Form, safety data sheet (if applicable), product data information, and a sample of the product being tested must be submitted to the Division of Materials and Tests. FTIR testing will be conducted on the sample and the 'fingerprint' will be kept on file.

The Department reserves the right to remove products as a result of failing test results of the Tensile Strength Ratio (TSR) and the Ten-Minute Boil Test using local aggregates.

NEW REQUIREMENT

New products must have been tested through NTPEP. Current products on this list must be submitted for testing through NTPEP by September 30, 2021, in order to remain on the list.

See the following link for more information on NTPEP:

<http://www.ntpep.org/Pages/WarmMixAsphaltTechnologies.aspx>

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TDOT Ten Minute Boil Test

The following steps are performed for the Ten-Minute Boil Test:

1. Reduce a sample of course aggregate to 500 grams. Into each of three beakers, weigh 100 grams of the aggregate and place in an oven for 30 minutes at $300\pm 10^{\circ}$ F.
2. Place a one-quart can, approximately $\frac{3}{4}$ -full of hot asphalt cement, into an oven for 30 minutes at $300\pm 10^{\circ}$ F.
3. Weigh the following amounts of the anti-strip additive into 3 separate containers: 0 grams, 0.3 grams and 0.5 grams. Add asphalt to each container to bring the total mass of each mixture and container to 100 grams. Stir thoroughly and place back into the oven for 30 minutes to return to $300\pm 10^{\circ}$ F.
4. Into one beaker with 100 grams of aggregate, add 5 grams of asphalt cement containing 0% anti-strip additive and stir thoroughly to ensure all aggregate particles are completely covered.
5. Pour out the coated aggregate particles onto a piece of wax paper and allow it to cool to room temperature.
6. Place the coated particles with the wax paper into a beaker of boiling water.
7. Remove the wax paper with tongs and allow the coated particles to remain in the boiling water for 10 minutes.
8. Remove the beaker from the heat source.
9. Skim off any free bitumen from the surface of the water to prevent recoating.
10. Cool to room temperature, decant the water, and empty the wet mix onto white paper or cardboard.
11. Repeat steps 4 through 10 for the remaining containers of 0.3% and 0.5% anti-strip additive.
12. The results must show at least 95% coverage for approval.

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SECTION B: FIBER ADDITIVES

GENERAL

This evaluation procedure outlines the Department's approval process for slag wool or cellulose fiber additive to increase durability and prevent drain down in hot mix asphalt (HMA) mixtures.

SPECIFICATIONS

- AASHTO T305 – Standard Method of Test for Determination of Draindown Characteristics in Uncompacted Asphalt Mixtures
- Special Provision SP411OGFC – Special Provision Regarding Bituminous Plant Mix (Hot Mix) Open-Graded Friction Course

PROCEDURES

A completed Product Evaluation Form, safety data sheets, product data information, and a one-pound sample of the product being tested must be submitted to the Division of Materials and Tests.

AASHTO T305:

1. Mix and prepare laboratory specimens of open-graded friction course (OGFC). Specimens shall meet all requirements listed for OGFC aggregate blends in SP411OGFC.
2. At least one specimen shall be prepared with no fiber additive, and a second minimum of one specimen shall be prepared with the fiber additive.
 - a. Cellulose fiber additives shall be added at a rate of 0.3% by weight of total mixture
 - b. Slag wool fiber additives shall be added at a rate of 0.4% by weight of total mixture.
3. Complete the drain down test procedure as presented in AASHTO T305.
4. The results must show that mixtures with additive exhibit less than 0.3% drain down.