



**DEVELOPMENTAL SPECIFICATIONS
FOR
HOT MIX ASPHALT TREATMENT FOR MOISTURE SENSITIVITY**

Effective Date
August 20, 2002

THE STANDARD SPECIFICATIONS, SERIES 2001, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

Section 2303 of the Standard Specifications shall apply with the following changes:

2303.02, E, 2, Hydrated Lime

Replace the title and entire article.

2. Hydrated Lime Antistrip Agent

On **Primary routes designed for over 10,000,000 ESALs and all** Interstate highways, if 25% or more of the plus No. 4 (4.75 mm) (virgin and RAP) aggregate is gravel, quartzite, granite, trap rock, steel slag, or other siliceous aggregate (not a limestone or dolomite), **hydrated lime anti-strip agent** will be required in the affected **intermediate and surface course** mixture **unless the minimum requirements for moisture sensitivity are met.**

On **all other** Primary highways **other than Interstate highway**, if 25% or more of the plus No. 4 (4.75 mm) (virgin and RAP) aggregates or more than 40% of the total (virgin and RAP) aggregates is quartzite, granite, or other siliceous aggregates (not limestone or dolomite) which is obtained by crushing from ledge rock, **hydrated lime anti-strip agent** will be required in the affected mixtures requiring Type A aggregates **unless the minimum requirements for moisture sensitivity are met.**

Hydrated lime Anti-strip agent will not be required for base repair, patching, or temporary pavement.

When **hydrated lime anti-strip agent** is required based on aggregate source, the Contractor may arrange for **Superpave** moisture sensitivity evaluation of the proposed HMA mixture design according to AASHTO T 283, "Resistance of Compacted Bituminous Mixture to Moisture-Induced

Damage.” When results of this evaluation indicate more than 80% tensile strength retained (TSR), hydrated lime on mixtures without anti-strip agent indicate the minimum requirements for moisture sensitivity of 80% tensile strength ratio (TSR) with visual confirmation are met, anti-strip agent will not be required. Confirmation of AASHTO T 283 test results will be completed by the Central Materials Laboratory during placement of the test strip the initial production and placement of the mix.

When a liquid anti-strip additive or aggregate treatment is used, confirmation of the AASHTO T 283 test results will be completed by the Central Materials Laboratory during the initial production and placement of the mix.

One of the following anti-strip agents shall be used:

a. Hydrated Lime.

Hydrated lime shall meet the requirements of AASHTO M 17, except that the gradation shall be determined in accordance with AASHTO T 11 M 303, Type I. Section 4193 of the Standard Specifications shall not apply. Hydrated lime will not be considered part of the aggregate when determining the job mix formula and the filler/bitumen ratio.

b. Liquid Anti-strip Additives.

Liquid anti-strip additives blended into the asphalt binder shall be approved for each JMF. The approval will be based on the following conditions:

- 1) Asphalt binder supplier shall provide test results that the additive does not negatively impact the asphalt binder properties, including short term and long term aged properties.
- 2) The AASHTO T 283 test is required and must satisfy 80% TSR when compared to the dry strength of specimens prepared with asphalt binder not containing the anti-strip additive. The design shall establish the optimum additive rate.
- 3) A change in the source of asphalt binder or aggregates will require a re-evaluation of the AASHTO T 283 test. When there is a significant change in the aggregate proportions, the Engineer may require a re-evaluation of the AASHTO T 283 test.

c. Polymer-based Liquid Aggregate Treatments.

Polymer-based liquid aggregate treatments shall be approved for each JMF. The approval will be based on the following conditions:

- 1) The AASHTO T 283 test is required and must satisfy 80% TSR when compared to the dry strength of specimens prepared with and without the aggregate treatment. The design shall establish the optimum additive rate.
- 2) A change in the source of asphalt binder or aggregates will require a re-evaluation of the AASHTO T 283 test.

2303.03, B, 1, c, Handling Hydrated Lime Anti-strip Agents

Add as second and third paragraph.

When liquid anti-strip additives are used, the equipment used to store, measure, and blend the additive with the asphalt binder shall comply with the anti-strip supplier's recommended practice. The additive may be injected into the asphalt binder by the asphalt supplier or the Contractor. If the Contractor elects to add the liquid anti-strip additive, the Contractor assumes the material certification responsibilities of the asphalt binder supplier. The shipping ticket shall report the type and amount of additive and the time of injection. The asphalt supplier shall provide the Contractor and Engineer with the shelf life criteria defining when the anti-strip additive maintains its effectiveness. Binder that has exceeded the shelf life criteria will not be used.

When polymer-based liquid aggregate treatment is used, the Contractor will comply with the manufacturer's current recommended specifications and guidelines.

2303.03, B, 1, c, 3, Hydrated Lime Added to the Aggregate Stockpile

Add as a new article.

3) Hydrated Lime Added to the Aggregate Stockpile

Hydrated lime shall be added at a rate established by the AASHTO T 283 test. The hydrated lime shall be added to the source aggregates defined in Article 2303.02, E, 2, thoroughly mixed with sufficient moisture to achieve aggregate coating, and then placed in the stockpile.

2303.04, B, 1, SAMPLING AND TESTING

Add at the end of the article.

When liquid anti-strip additives are used, the Contractor shall satisfy one of the following methods to regulate the quantity of additive:

a. The Contractor shall present a Certification certifying the equipment used to measure and blend the liquid anti-strip meets the anti-strip supplier's recommended practice, that the equipment is directly tied to the asphalt binder supply system, and that the equipment has been calibrated to the equipment manufacturer's guidelines.

b. The Contractor shall test the binder to measure the quantity of liquid anti-strip additive in the binder every 5000 tons (5000 Mg) of HMA production. The supplier's test method shall be approved by the Engineer prior to use of the test.

c. The Contractor shall run AASHTO T 283 during production. If the Contractor is unable to certify or test for the presence and quantity, the Contractor shall run AASHTO T 283 each 10,000 tons (10,000 Mg) of production to measure the effectiveness of the additive. The test must satisfy 80% TSR when compared to the dry strength of specimens prepared with asphalt binder containing the anti-strip additive.

2303.04, D, 1, Loose Material Requirements

Add as sixth paragraph.

When sampling for AASHTO T 283, the Contractor shall obtain a 50 pound (25 kg) sample in accordance with Materials I.M. 322. The Engineer will select, at random, the sample location. The Contractor shall split the sample and deliver half to the Central Materials Laboratory.

2303.05, D, Hydrated Lime

Replace the title and the entire article.

D. Hydrated Lime Anti-strip Agent.

Hydrated lime Anti-strip agent incorporated in HMA mixtures shall be considered incidental to HMA and will not be measured.

2303.06, A, Hot Mix Asphalt Mixture

Add as the fourth paragraph.

When liquid anti-strip agent is used and production quality control testing for AASHTO T 283 is required, the payment for HMA will be adjusted by the following percentages.

Percent TSR	Percent of Full Payment
greater than 79	100
79 to 70	90
less than 70	75 maximum

2303.06, G, Anti-strip Agent.

Add title and new article.

G. Anti-strip Agent.

For the quantity of each HMA mixture with anti-strip agent, the Contractor will be paid the predetermined contract unit price per ton (megagram) of HMA mixture for designing, adding, and testing of anti-strip.