S T A T E **O F** **T E N N E S S E E**

(Rev. 06-01-06) March 1, 2006
(Rev. 02-01-07)
(Rev. 12-30-08)
(Rev. 01-05-10)
(Rev. (12-09-13)

Supplemental Specifications - Section 300

of the

Standard Specifications for Road and Bridge Construction

March 1, 2006

Subsection 303.08 (c) Second paragraph after (c), first sentence **Add** the word "exceeds" between the words "course" and "6 in. (150 mm)"

Subsection 303.13; Delete the second and third paragraphs and replace with the following:

> The weight of total moisture, as determined by dry weights, of the base material at the time of weighing in excess of 3 percentage points of optimum moisture content, will be deducted. When mixing is performed in a stationary plant, no direct payment for water will be made. When road mixing is performed, water added to the material during mixing at the direction of the Engineer will be made for payment.

SECTION 304-SOIL-CEMENT BASE Insert the following in the Table of Contents section of 304

"304.11-Thickness and Surface Tolerances."

Subsection 304.04 Last paragraph, add the word "be" in this section of the paragraph

"the entire section shall be reconstructed…"

Subsection 307.03b Composition of Mixtures, Revise entire subsection b to the following:

(b) Recycled Asphalt Pavement and Recycled Asphalt Shingles.

Recycled Asphalt Pavement (RAP)

The Contractor may utilize asphaltic concrete removed from a Department project or other State Highway Agency project by an approved method and stored in a TDOT approved stockpile. RAP combined with the appropriate aggregate, asphalt cement, and anti-strip additive when required shall produce a mixture that will otherwise meet all the requirements of **Subsection 903.06** and the requirements herein **Section 307**. RAP shall be allowed in each mix listed in the following table:

Mix Type	%RAP (Non-processed)	Maximum %RAP (Processed)	Maximum % RAP Processed and Fractionated	Maximum Particle size
307ACRL	0	00	-	-
307AS	0	00	-	-
307A	15	20	35	1 ½ in. (38 mm)
307B	15	30	35	1 ½in. (38 mm)
307BM	15	30	35	¾ in. (19 mm)
307BM2	15	30	35	¾ in. (19 mm)
307C	15	30	35	3/8 in. (9.5 mm)
307CW	15	30	35	½ in. (13 mm)
307CS	0	15	25	5/16 in. (8 mm)

RAP that has been crushed and screened or otherwise sized such that the maximum recycled material particle size is less than that listed in the table above prior to entering the dryer drum, shall qualify as “Processed”. “Non processed” **RAP** shall be similar material that has not been crushed and screened or otherwise sized previous to its use. When RAP is processed over more than one screen, producing sources of various maximum particle size (i.e. – ¾” to ½”, ½” to #4, etc.), it will be referred to as “fractionated”, and larger percentages will be allowed as noted above. These increased percentages will only be allowed provided the individual fractions are introduced into the plant as separate material sources for increased control.

All mixes shall contain at least 65% virgin asphalt.

The Contractor shall obtain a representative sample from the recycled material stockpile and establish a gradation and asphalt cement content as required. The Contractor shall determine the gradation and asphalt content of the recycled material at the beginning of a project and every 2,000 tons(2,000 metric tons) thereafter. The stockpile asphalt cement content for all recycled material shall not vary by more than 0.8%. The stockpile gradation tolerance for all recycled material on each sieve is listed below.

3/8 in. (9.50 mm) sieve and larger± 10%
No. 4(4.75 mm) sieve.....± 8%

No. 8(2.36 mm) sieve.....± 6%
No. 30(600 µm) sieve .....± 5%
No. 200(75 µm) sieve .....± 4%

The mixture will be accepted for aggregate gradation and asphalt content based on extractions

A special design with asphalt content in the range of 5 to 7% shall be required where 307 C Mix is used as a surface on the shoulder.

The Contractor shall be responsible for his own sampling and testing of the planings as well as new materials for bid purposes, and for the submission of the job mix formula in accordance with Subsection 407.03. All additives shall be submitted to the Engineer for approval at the same time other materials are submitted for design verification.

If the Department has performed tests on the pavement to be cold planed, the results of all tests will be available at the Materials and Tests Division in Nashville, Tennessee during normal working hours. This information is advisory only and shall not be construed as necessarily complete nor accurate.

Where it is necessary to obtain a sample of the existing pavement for mix design, the Contractor shall mill the existing pavement to the full depth shown on the plans for pavement removal for a length of approximately 300 ft. (100 m) in an area approved by the Engineer. The removed pavement shall be replaced as specified on the plans or directed by the Engineer.

After mixing, the moisture content of the total mix shall be no more than 0.1% as determined by oven drying, and the provisions for lowering the temperature because of boiling or foaming shall not apply.

Recycled Asphalt Shingles (RAS)

Recycled Asphalt Shingles (RAS) may be included to a maximum of 5 percent of the total weight of mixture. The percentage of RAS used will be considered part of the maximum allowable RAP percentage. The ratio of added new asphalt binder to total asphalt binder shall be 65% or greater for all 307 mixes. Either the mix producer or the RAS supplier shall obtain a representative sample from the recycled material stockpile and establish a gradation and asphalt cement content as required. Shingle asphalt binder content shall be determined by AASHTO T-164 Method A, with a minimum sample size of 500 grams. The Contractor shall determine the gradation and asphalt content of the recycled material at the beginning of a project and every 2,000 tons (2,000 metric tons) of recycled material used thereafter. The stockpile asphalt cement content for all recycled material shall not vary by more than 0.8%. All RAS material shall be processed to a minimum 100 percent passing the 3/8 inch (9.5-mm) sieve and a minimum 90 percent passing the #4 (4.75-mm) sieve.

To conduct the gradation testing, a 500-700 gram sample of processed shingle material is air dried and dry sieved over the 3/8” and #4 sieves and weighed. For Mix Design purposes, the

following aggregate gradation may be used as a standard gradation in lieu of determining the shingle gradation by AASHTO T30.

Sieve Size	% Passing
3/8 inch (9.5 mm)	100
#4 (4.75 mm)	97
#8 (2.36 mm)	95
#16 (1.16 mm)	80
#30 (0.60 mm)	60
#50 (0.30 mm)	50
#100 (0.150 mm)	40
#200 (0.075 mm)	30

An aggregate bulk specific gravity (G_{sb}) of 2.650 may be used in lieu of determining the shingle aggregate G_{sb} (AASHTO T84). In addition, the effective binder available for mixing with additional aggregates shall be considered as 75 % of the total binder content as determined by AASHTO T-164 described above and shall be the value listed as the RAS binder content on the Job Mix Formula.

Scrap asphalt shingle shall not contain extraneous waste materials. Extraneous materials including, but not limited to, asbestos, metals, glass, rubber, nails, soil, brick, tars, paper, wood, and plastics shall not exceed 0.5 percent by weight as determined on material retained on the 4.75-mm (No. 4) sieve. To conduct deleterious material testing, a representative 500-700 gram sample of processed shingle material shall be sieved on the #4 sieve and any extraneous waste material retained on the #4 sieve is picked and weighed. The percent extraneous is based on the total sample weight.

RAS shall contain less than the maximum percentage of asbestos fibers based on testing procedures established by TDOT, state or federal environmental regulatory agencies. A minimum of one (1) sample of processed asphalt roofing material for every five hundred (500) tons of material processed shall be analyzed for the presence of asbestos containing material.

Before a Job Mix Formula for a particular design is approved, the following shall be submitted, along with materials and paperwork required by TDOT Specification 407.03:

- Certification by the processor of the shingle scrap describing the shingle scrap content and source.
- A 1000g sample of the processed RAS material for inspection (new designs only)

RAS shall be stockpiled separate from other salvage material. Blending of RAS material in a stockpile with other salvage material is prohibited. Blending of Manufacture Waste Scrap Shingles (MWSS) and TOSS shall not be allowed. In addition, blending of a virgin sand material with the processed shingles, to minimize agglomeration of the shingle material, shall not be allowed.

All RAS supplied to a TDOT project must come from a certified shingle processor/supplier approved by TDOT Headquarters Materials and Tests.

(c) Anti-Strip Additive - Asphaltic concrete mixtures (Grading A, AS, ACRL, B, BM, BM2, C, CS and CW) shall be checked for stripping by the following methods:

1. The Ten Minute Boil test for dosage rate and the Root-Tunnecliff procedure (ASTM D 4867) for moisture susceptibility.
2. For mixtures not requiring design - the Ten Minute Boil test for dosage rate and moisture susceptibility.

   * Root-Tunnecliff procedure (ASTM D 4867) shall not be used with the following mixtures: Grading A, AS, ACRL and B

If moisture susceptibility is indicated, then an approved anti-strip agent shall be mixed with the asphalt cement at the dosage recommended by the respective test and as specified in **Subsection 918.09(B).**

Subsection 307.08 Method of Measurement, Revise entire subsection to the following:

307.08-Method of Measurement. Aggregate and Asphalt Cement for Bituminous Plant Mix Base (Hot Mix) will be measured by the ton (metric ton) in accordance with the provisions of **Subsection 407.19**. Materials for prime or tack coat, if specified, will be measured as prescribed in **Section 402** or **403**, respectively.

If recycled mix is permitted, the completed mix, including new mineral aggregate, planings, asphalt cement and additive, shall be measured by the ton (metric ton) in accordance with **Section 109**. For bidding purposes, the asphalt cement content of the specified mixes shall be used in the chart below:

Mix Type	Asphalt Content
307 A	4.0%
307 B	4.3%
307 BM	5.0%
307 BM2	5.0%
307 C	5.0%
307 CW	6.0%
307 CS	6.5%

In the event that the Engineer sets an asphalt content other than that stated above, a price adjustment will be made based on the asphalt content set by the Engineer and the Monthly Bituminous Index for the specific grade asphalt on the mix design. The price adjustment will be calculated according to the following formula:

PA = [MBI x (DA-BA) x T] / 100

Where:

PA = Price Adjustment
MBI = Monthly Bituminous Index
DA = Percent asphalt set on the mix design
BA = Percent asphalt specified above to be used for bidding
T = Total tons(metric tons) asphalt mix for price adjustment

The liquid anti-strip additive will be measured by the gallon(liter) and paid as outlined in **Subsection 307.09**. Hydrated Lime will be measured by the ton (metric ton) and paid as outlined in **Subsection 307.09.**

No direct payment will be made for polymer or latex additives and cost thereof shall be included in the price bid for the modified asphalt cement or modified mixture.

Subsection 309.13; Delete the second and third paragraphs and replace with the following:

> The weight of total moisture, as determined by dry weights, of the base material at the time of weighing in excess of 3 percentage points of optimum moisture content, will be deducted. When mixing is performed in a stationary plant, no direct payment for water will be made. When road mixing is performed, water added to the material during mixing at the direction of the Engineer will be made for payment.

Subsection 312.08 Last sentence, Add the word “exceed”

> “1 layer shall not exceed 8 in. (200 mm).”

Subsection 313.02-Materials, Add the following to the end of this section

Liquid Membrane – Forming Compounds 913.05

Subsection 313.05; section (a) 1. Add to the end of the paragraph

As an alternative to the steel wheel roller, the cement treated permeable base may be placed with a high-density screed with dual tamping bars.

Subsection 313.05; section (a) 2. Revise the first paragraph to read as follows

Curing; Immediately after spreading and compacting, the cement treated permeable base shall be cured by covering the entire surface and exposed edges with transparent or white polyethylene sheeting in accordance with **Subsection 501.18**, or a white pigmented wax base curing compound meeting the requirements of AASHTO M148. The polyethylene sheeting shall have a thickness of at least 4 mils (100 μm) and shall be held in place for a minimum of 7 days by a method approved by the Engineer. The surface of the cement treated permeable base shall be thoroughly wetted prior to placing the sheeting. The wax based curing compound shall be placed at a rate of 0.04 to 0.05 gallons per square yard (0.18 to 0.23 liter per square meter).