

VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
RECLAIMED ASPHALT SHINGLES (RAS) (TEAR OFFS) IN HOT MIX ASPHALT CONCRETE

June 24, 2008

I. DESCRIPTION

This specification covers reclaimed asphalt shingles (RAS) tear-offs used in hot mix asphalt (HMA) concrete. These requirements are to be met in addition to those contained in Section 211 of the Specifications. The Contractor shall receive approval by the Engineer to use RAS tear-offs in the HMA concrete.

II. MATERIALS

- (a) **Tear-off RAS materials** shall be discarded shingle scrap from the re-roofing of domestic buildings. These tear-offs shall have been produced by the manufacturing process for roofing shingles. Blending or mixing of Tear-offs with Tabs shall not be permitted.

Tear-off RAS materials shall be free from foreign materials such as paper, roofing nails, wood, or metal flashing. Materials shall be shredded prior to being incorporated in the HMA mixture so that one hundred percent of the shredded pieces are less than 1/2 inches (12.5 mm) in any dimension.

Tear-off RAS materials shall not contain asbestos fibers. If tear-off shingles are to be used, the Contractor shall furnish test results of RAS sample analysis for Polarized Light Microscopy (PLM) on the tear-off shingles which certify the material to be used is free of asbestos. Testing is required at the specified rate of 1 per 100 tons of RAS prior to processing and results shall be submitted prior to or during the stockpile approval process.

- (b) **Asphalt Binder shall be** Performance Grade (PG) of asphalt conforming to the requirements specified in Section 211 and Table II-14A, Asphalt Concrete Mixtures (Superpave.) The selection of the PG of asphalt from Table II-14A shall be governed by the combined amount of RAS and RAP.

(For estimation purposes only, it may be assumed that 1 percent RAS is equivalent to 4 percent RAP.)

III. DETAIL REQUIREMENTS

RAS tear-offs in hot mix asphalt concrete shall be mixed mechanically in a plant specifically designed for producing hot mix asphalt for HMA production.

IV. JOB-MIX FORMULA

The Contractor shall submit a job mix formula in accordance to section 211.03 of the Specifications. The Contractor shall submit material samples to include the RAS stockpiled tear-off shingles, reclaimed asphalt pavement (RAP) and PG Binder.

The amount of RAS material used in the recycled mixture shall be no more than five percent of the total mixture weight. The combined percentages of RAS and RAP shall not contribute more than twenty-five percent of the total asphalt content of the mixture, according to the following equation:

$$\frac{\left(\%RAS_{mix} \times \%AC_{RAS} / 100\right) + \left(\%RAP_{mix} \times \%AC_{RAP} / 100\right)}{\%AC_{JMF}} \leq 25.0\%$$

Where:

% RAS _{mix} =	Percent RAS in the Job Mix Formula
% AC _{RAS} =	Average Percent AC in the RAS
% RAP _{mix} =	Percent RAP in the Job Mix Formula
% AC _{RAP} =	Average Percent AC in the RAP
% AC _{JMF} =	Design AC content of the JMF

The Contractor shall determine the asphalt content of the RAS using AASHTO T-164, Method B, or AASHTO T-308 and report the average results to the nearest 0.1 percent.

V. STORING MATERIALS

Contractors shall store tear-off RAS by stockpiling either whole or as partial shingles which have not been shredded or shredded shingles that meet the maximum size requirements. Stockpiled RAS shall not be contaminated by dirt or other objectionable foreign materials. Blending of the shingles with fine aggregate may be necessary to prevent conglomeration of shingle particles. When fine aggregate is used for this purpose, this material shall be accounted for in the mix design. Tabs shall be stockpiled separately.